DOCUMENT RESUME

ED 223 054 EC 150 356

AUTHOR Short, Andrew B.
TITLE Short-Term Treatment Outcome Using Parents as Co-Therapists for Their Own Autistic Children. Final Report.
SPONS AGENCY Bureau of Education for the Handicapped (DHEW/OE), Washington, D.C.
PUB DATE 80
GRANT G007803010
NOTE 148p.; Ph.D. Dissertation, University of North Carolina at Chapel Hill
PUB TYPE Reports - Research/Technical (143) -- Dissertations/Theses - Doctoral Dissertations (041) -- Tests/Evaluation Instruments (160)

EDRS PRICE MF01/PC06 Plus Postage.
DESCRIPTORS *Autism; Behavior Change; *Behavior Modification; Child Development; Coping; Home Programs; Intervention; *Parent Child Relationship; *Parent Education; *Parent Role; *Psychoeducational Methods; Therapy; Time Factors (Learning); Young Children

ABSTRACT

The study, involving 15 autistic children (2-7 years old) and their families investigated the short term effects of a treatment model in which parents are trained as co-therapists in teaching developmental skills and behavior management. Literature was reviewed on models for treatment of autism, studies of treatment efficacy with autism, and methodological issues for autism outcome studies (including the nature of treatment, subject selection and description, measures of therapeutic change, and overall design). The study tested four hypothesized effects of treatment: 1) parents would show an increase in the degree to which they are actively involved with their child during time spent together; 2) the autistic children would show an increase in the amount of time they either engaged in appropriate play or work, or interact with other people; 3) the autistic children would show a decrease in the amount of time engaged in inappropriate play with objects, in self stimulatory behavior, and in the time spent not interacting with either objects or people; and 4) the family would show an increase in their ability to handle the child's problems in the home without sacrificing other important aspects of family life. Direct behavioral observations and clinicians' ratings of family stress and adaptation (based on semi-structured interviews with mothers) were obtained during home visits at three times for each family. The overall results for the four main hypotheses indicated that the use of parents as co-therapists in the psychoeducational treatment of their own autistic children was effective. Parents became more actively involved with their children as a result of treatment. The autistic children showed more appropriate behavior as a result of treatment. Both inappropriate behavior by the child and the family's ability to cope with the autistic child improved over the treatment period, and showed trends toward significant treatment effects. Among appendixes are guidelines for behavioral observations, interview procedures, sample questionnaires on the effects of treatment, an apparatus checklist for home visits, a questionnaire on the effects of child problems on the family, guidelines for the initial research phone contact, and tables with statistical data. (SW)

Final Report: G00-78-03010

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
This document has been reproduced as received from the person or organization originating it.
Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

ED223054

SHORT-TERM TREATMENT OUTCOME USING PARENTS AS CO-THERAPISTS FOR THEIR OWN AUTISTIC CHILDREN

by

Andrew B. Short

A Dissertation submitted to the faculty of The University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the Department of Psychology.

Chapel Hill

1980

Approved by:

Eric Schopler
Advisor

Barclay Martin
Reader

Lori M Ivers
Reader

EC150356

ANDREW BELDING SHORT. Short-term Treatment Outcome Using Parents as Co-therapists for their Own Autistic Children (Under the direction of Eric Schopler.)

ABSTRACT

The present paper reports the results of a study of the short-term effects of Schopler and Reichler's (1971) treatment model for autistic children. Parents are trained as co-therapists in this approach which involves teaching developmental skills and behavior management. The model was studied as it is utilized in a statewide clinical service program in North Carolina. Fifteen children less than eight years old participated. Subjects were selected from a series of consecutive referrals to the treatment program. There were 12 boys and 3 girls. The mean IQ was 54.0, with a wide range from profound mental retardation to normal intelligence on tests emphasizing non-verbal skills. The design called for three evaluation points. Two of these occurred at the beginning and end of a waiting period. The third occurred after a 6-8 week session treatment period. Data were collected on home visits occurring at each evaluation point. The primary measures were direct behavioral observations and a blind rating of family stress and adaptation by clinicians from semi-structured interviews with mothers. Secondary measures included questionnaires on family adaptation and treatment effects.

Four main hypotheses were tested using variables created by the main measures as follows: (1) That parents would increase their active involvement with their children as a result of treatment. This was

tested using a variable which was the sum of four parent behavior observation categories (Verbal Guidance, Gestural Guidance, Physical Guidance, and Social Attention). (2) That children would show an increase in appropriate behavior as a result of treatment. This was tested on the sum of five child behavior categories (three social interaction categories, Appropriate Play or Work, and Meaningful Communication). (3) That the children's inappropriate behavior would decrease as a result of treatment. This was tested using another sum of child behavior categories (Self-stimulation, Repetitive Object Play, and Sustained Non-interaction). (4) That the families' adaptation to the stress of having an autistic child would improve as a result of treatment. This was tested using a sum of scores in seven areas of the interview rating. The data were analyzed with a multivariate analysis of variance for repeated measures to compare change during the treatment period with change during the waiting period.

The overall hypothesis that there was change as a result of treatment was confirmed. While all four of the main outcome variables showed significant change with treatment, the change during treatment was greater than that during the waiting period only for the first two hypotheses. A trend towards significant change during the waiting period reduced the chances of finding a treatment effect on the family adaptation measure. Results are discussed with implications for treatment.

ACKNOWLEDGMENTS

Whatever faults may lie in it, this dissertation is stronger because of the participation in its design and implementation of many people.

I feel especially grateful to the families who welcomed us into their homes and accepted the interviews and observations so well. They are the most important people involved in the work reported here.

Eric Schopler has been my main advisor on this project from its inception. Barclay Martin has been extremely helpful, particularly in matters of design and choice of measures. Bill Anderson, Grant Dahlstrom, Lee Marcus, and Steve Schroeder have served on my dissertation committee. Tney have been both critical and supportive.

Erica Eisdorfer spent more time on the study than anyone but the author. She helped to develop the behavior observation coding system. Melissa Johnson and Erica accompanied me on home visits, serving both as behavior observers and child care givers. Ann Baker, Bob Foster, Barbara Hawk, and Vickie Shea were the clinicians who rated the interviews.

Several TEACCH therapists carried out the treatment of the families and children in the study: Deborah Boren, Patty Burke, Sally Davis, Sue Fernald, Kay Flinn, Ruth Fuller, Miggie Lansing, Carol Logie, Nadine McBride, and Mary Beth van Bourgondien. Their excellent work is reflected in the results of the study. Some of them also helped with other aspects of the study.

Connie Brite provided much needed administrative guidance.

Jim Smith was a highly competent and tireless computer consultant.

Carolyn Harris worked tirelessly to help me meet deadlines and produce the typed copy as it now appears.

Andrea Vizoso continuously offered intelligent commentary and emotional support.

Others who gave helpful advice and other aid include:

Carol Andrews
Mark Appelbaum
Edwina Bentz
David Budescu
Barbara Callahan
Bob DeVellis
Pat Eichman
Cindy Fesmire
Elaine Goolsby
Tom Gualtieri
James Hamilton
Rosemary Hemsley
Neil Jacobson
Kar Wang Lau
Karen Lovejoy
Margie Mebane
Cathy Miller
Arnie Rincover
Johannes Rojahn
Helen Samuels
Ray Schmitt
Sharon Schroderbeck
Evelyn Shaw
Chih Chung Shen
Hal Shigley
Jerry Sloan
Hans Strupp
Jack Wall

The research was generously supported by a grant from the Bureau for the Education of the Handicapped.

TABLE OF CONTENTS

LIST OF TABLES..... vii

LIST OF FIGURES..... viii

I. REVIEW OF THE LITERATURE..... 1

II. METHOD..... 32

III. RESULTS..... 49

IV. DISCUSSION..... 68

REFERENCES..... 91

APPENDIX A..... 100

APPENDIX B..... 107

APPENDIX C..... 111

APPENDIX D..... 122

APPENDIX E..... 126

APPENDIX F..... 127

APPENDIX G..... 129

APPENDIX H..... 130

APPENDIX I..... 132

APPENDIX J..... 133

LIST OF TABLES

TABLE

1 Characteristics of Subjects 34

2 Inter-rater reliability for behavior coding: Rater #1 with Rater #2 41

3 Inter-rater reliability for behavior coding: Rater #1 with Rater #3 42

4 Inter-rater reliability for interview ratings 45

5 Mean scores on main outcome measures 51

6 Mean scores on parent behavior categories 56

7 Mean scores on appropriate child behaviors 58

8 Mean scores on Questionnaire on Effects of Child Problems on Family 62

9 Mean scores on Questionnaire on the Effects of Treatment 63

10 Mean scores on selected conditional probabilities 65

11 Parent involvement scores by family 133

12 Appropriate child behavior by family 134

13 Inappropriate child behavior by family 135

14 Stress scores by family 136

15 Mean scores on inappropriate child behaviors 137

16 Mean scores for interview rating areas 138

LIST OF FIGURES

FIGURE

1 Design of the study 33

2 Main outcome measures 52

3 Parent behavior over three visits 55

4 Child behavior over three visits 57

5 Questionnaire on negative child effects over three visits 61

I. REVIEW OF THE LITERATURE

Outcome Studies: Four Methodological Areas

Although few would deny their importance, the evolution of scientific studies of the effects of psychological treatments has been slow and difficult. A concise formulation of the basic question posed in treatment outcome studies was offered by Strupp and Bergin (1969): "What specific therapeutic interventions produce specific changes in specific patients under specific conditions?" (p. 19). Conclusive answers to this question have been elusive. Few studies have been able to avoid the methodological flaws which tend to occur when one tries to use experimental designs in applied research. Strupp and Bergin (1969) comment:

> Most researchers have been faced with serious limitations in collecting data from representative samples of patients and therapists. Furthermore, follow-up studies have been difficult to carry out, the crucial requirement of enlisting full cooperation of therapists, patients, and institutions has been a continued stumbling block, and, in general, rigorous designs have been difficult to impose upon the therapeutic phenomena themselves. (p. 19)

Previous research has delineated issues in four basic areas to consider in designing or evaluating outcome studies (cf., Jacobson & Martin, 1974; Patterson & Reid, 1973; Sloane, Staples, Cristol, Yorkston & Whipple, 1975; Strupp & Bergin, 1969). First, the nature of the intervention being evaluated should be specified and shown to be feasible for more widespread application. Second, subjects must be selected in such a way that they can be expected to be fairly typical of the

population for which the treatment is designed. Detailed information concerning subject characteristics should be given so that they can be compared with subjects of other studies, particularly on dimensions which might be expected to relate to outcome. Third, the measures used should be suitable for answering specific questions about the effects of therapy and should be reliable, valid, and as free as possible of bias. Patterson and Reid (1973) advocate the use of several outcome measures to assess generalization of treatment effects as well as targeted changes. Fourth, the design of the study should include control groups which make it possible to ascertain whether or not changes that do take place are due to treatment procedures. Follow-up evaluations should also be made to assess whether or not changes are maintained after the termination of treatment.

Models for Treatment of Autism

Since Kanner's original description of eleven autistic children (Kanner, 1943), a variety of treatment approaches have been offered as remedies for the disorder. These include psychodynamic therapies (e.g., Bettelheim, 1967; Berlin, 1978), behavioral therapies (e.g., Lovaas, Koegel, Simmons & Long, 1973), special education (e.g., Halpern, 1970), drug therapies (Campbell, 1978), electro-convulsive shock treatments (Bender, 1947), rage reduction therapy (Zaslow & Breger, 1969), dance therapy (Gunning & Holmes, 1973), mega-vitamin therapy (Rimland, 1973), and sensory isolation therapy (Schecter, Churley, Tousieng & Maier, 1969). Treatment modalities have involved individual treatment sessions (Ekstein, 1966), group therapy (Speers & Lansing, 1965), residential treatment (Goldfarb, Goldfarb & Pollock, 1966), day programs (Wenar,

Ruttenberg, Dratman & Wolf, 1967), and family-oriented treatment (Schopler & Reichler, 1971). However, while most approaches make some claim to treatment success, very few have produced controlled research on treatment efficacy.

Psychodynamic theory was the dominant influence on the treatment of autism from the 1940's through the early 1960's. This was probably due to Kanner's emphasis on the abnormalities of social interaction which are characteristic of autistic children and his view that the parents were unusually cold and rigid individuals (Kanner, 1943). Psychodynamic theorists usually view autistic children as having been unable to develop object relationships because of early environmental events or deprivation (e.g., Bettelheim, 1967; Ruttenberg, 1970). Psychodynamic treatments focussed upon establishing a trusting relationship with a child and providing an atmosphere thought to be conducive to the development of ego functioning (Bettelheim, 1967; Eckstein, 1966). These approaches generally involved separating parents from their child's therapy, although the parents themselves were often expected to enter therapy which was independent of their child's treatment (Speers & Lansing, 1965).

During the 1960's and early 1970's, there was a radical shift in the literature concerning treatment of childhood autism from the emphasis on psychodynamic concepts and techniques to behaviorally oriented treatments, particularly techniques involving operant conditioning. This shift was encouraged by two research trends. The first involved follow-up studies expressing pessimism concerning the efficacy of traditional therapeutic approaches with autistic children (Brown, 1960; Eisenberg, 1957; Havelkova, 1968; Menolascino & Eaton, 1967). The

second trend was the proliferation of single subject studies of behavioral treatments that showed dramatic changes in several disturbed psychotic children (Leff, 1968). Focussing on the modification of overt behaviors, these workers were able to produce improvement in symptomatology considered central to childhood autism. These included such symptoms as abnormal social relations (Hingtgen & Trost, 1966; Lovaas, Schaeffer & Simmons, 1965), echolalia and language delay (Hewett, 1965; Lovaas, 1967; Risley & Wolf, 1966), avoidance of eye contact and failure to imitate (Hingtgen, Coulter & Churchill, 1967; Lovaas, Freitas, Nelson & Whalen, 1967; McConnell, 1967; Metz, 1965), and self-injurious and self-stimulatory behaviors (Koegel & Covert, 1972; Loovaas, et al., 1965; Wolf, Risley & Mees, 1964). Frequently accompanying these reports were clinical descriptions of positive changes in non-targeted behaviors as well (e.g., Wolf et al., 1964).

At the time when single subject studies of behavioral interventions with autism was proliferating, there were several reports of attempts to train parents to manage their own children's difficult behavior. Such studies were often based on social learning principles. While these attempts more commonly focussed on aggressive or oppositional children (O'Dell, 1974), a few workers used this approach with parents of autistic children (Kozloff, 1973; Rutter & Sussenwein, 1971; Schopler & Reichler, 1971; Wetzel, Baker, Roney & Martin, 1966; Wolf, et al., 1964). The importance of involving parents in the treatment of their own autistic children is indicated by findings in three of the studies described below (Browning, 1971; Lovaas, et al., 1973; Rutter & Bartak, 1973). All three indicated that changes produced in the children in settings outside of their homes did not generalize to their adjustment

at home.

Studies of Treatment Efficacy with Autism

Single subject studies of the modification of autistic behavior have demonstrated the value of operant techniques with individual cases. However, they provide no information concerning the general applicability of treatments to other cases unless a series of intersubject replications is done (Birnbrauer, Peterson & Solnick, 1974). Many single subject studies focus specifically on particular problems of a given child. This can leave the reader with little idea as to how valuable the treatment was to the child and his family since changes in isolated behaviors will have varying impact upon the child's overall functioning. Furthermore, techniques which help one child may not help another.

In order to establish the general efficacy of treatment programs, studies should investigate effects of treatment with a group of subjects and attempt to resolve issues in the four methodological areas described above as crucial to the study of therapeutic outcome in general. Seven major studies of treatments for autism are summarized below. Their handling of crucial methodological issues is discussed in the next section.

Within the context of a psychodynamically oriented program combining individual, milieu, and educational therapy, Goldfarb, et al. (1966) compared the effects of day and residential treatment. The authors divided their subjects into three major groups: (1) those who were unscorable on the WISC; (2) an "organic" group (whose WISC scores were in the moderately to severely retarded range); and (3) "non-organics"

(whose WISC scores were in the borderline to normal range). They split each of these groups into two matched groups. Half of the children received day treatment and half received residential treatment. Changes were assessed using WISC scores, Metropolitan Achievement Tests, and a psychiatric rating scale of ego functioning. They found that the group with the poorest functioning initially, the unscorable group, made no progress in therapy. The only difference between day and residential treatment occurred within the "non-organic" group, where residential treatment produced better results.

Wenar et al. (1967) compared the effects of three therapeutic milieus with autistic children. They included (1) a large state hospital which primarily offered custodial care; (2) a more modern state residential facility offering a varied program of activities including a school program; and (3) a psychoanalytically oriented day program. Children were evaluated before and after treatment using the BRIAC scale (Behavior Rating Instrument for Evaluating Autistic Children). The day treatment group showed greater improvement on BRIAC scales of relationship, mastery, and psychosexual development. There were no differences on communication or vocalization scales.

Browning (1971) reported a study of five autistic children treated in a residential setting with a "total behavior modification program." This meant that the children's entire day was planned around the reward and punishment of behavior. The children were trained in imitation, attentive behavior, language, and other skills such as self-help behavior. They were in treatment for one to three years. The primary outcome measures were simply a report on the extinction and acquisition of several behaviors. This data was given in terms of complete or

partial success, or failure. While behavioral change occurred with all children during treatment, the children did poorly when they returned home. The behavioral changes that had occurred required constant reinforcement to be maintained. Four of the five children were institutionalized shortly after being returned home.

Lovaas et al. (1973) were among the first to recognize the need for a group study of behavioral treatment of autism. They developed an objective system for assessing change through the observation and recording of the occurrence of five categories of behavior relevant to autism. Lovaas presents data showing that his subjects made positive changes while in treatment both on the behavioral observation measures and on tests of intellectual functioning and social maturity (Lovaas et al., 1973). However, this improvement was not maintained when the children left the treatment unit except in cases where parents were trained to continue the treatment procedures at home.

Rutter and Bartak (1973) studied the differential effects of three types of special education units for autistic children. They employed measures of social and behavioral progress. They found that while many of the children made significant progress in school on social and behavioral measures, this did not lead to social and behavioral progress at home. The second finding worth noting was that IQ was predictive both of scholastic and behavioral progress at school, and of social and behavioral progress in the home.

Ney et al. (1971) compared an operant treatment with play therapy in the treatment of a group of schizophrenic children. As will be discussed in more detail below, these children probably fit in the general category of early childhood psychoses. Ten matched pairs of

children underwent both types of therapy, with half of the children receiving play therapy first, and the other half receiving the operant treatment first. The outcome measures were mental age and amount of speech. The children made progress on these measures in both treatments, but made significantly more progress in the operant treatment.

Hemsley et al. (1978) evaluated a home-based approach to training parents to work with their own autistic children using behavioral procedures. They used a variety of outcome measures including tests of intellectual functioning, scales of language use and competence, recording of direct observations of both parent and child behavior in the home, parents' charting of target behavior, and interviews with the parents. After six months, changes in a treated group were compared with changes in a control group who received various types and amounts of treatment, including no treatment at all. After eighteen months, the same treatment group was compared with a group whose parents received some consultation in behavioral procedures for managing their children. The treatment appeared to have a significant positive impact upon the behavior of both parents and children. However, although the autistic children used more language after treatment, the developmental level of their language skill did not significantly improve with treatment. Similarly, there was no significant improvement with treatment on other measures of developmental skill such as IQ tests. Thus, the primary changes due to treatment appeared to be changes in parent-child interaction.

Methodological Issues for Autism Outcome Studies

As was noted at the outset of this paper, the design of treatment

outcome studies has been fraught with methodological problems. The seven studies of autism treatments which are described briefly above are no exception. Each has serious flaws which limit the interpretation and generalizability of the results obtained. In the present section, I will review issues and solutions to problems in each of the four methodological areas listed in the first section as crucial to the design of outcome studies. Aspects of the seven studies described above will be critically evaluated as they provide relevant examples for methodological points. The purpose of the review is to clarify problems and solutions bearing on the design of autism outcome studies.

The Nature of Treatment

There are two main issues concerning the nature of treatment which outcome studies must face. The first is the specification of treatment interventions that are hypothesized to cause therapeutic change. The second is the demonstration that the intervention could be reproduced in clinical services outside of the research context in which it is being studied.

Descriptions of treatment. Reports of experimental studies in psychology are generally expected to specify experimental procedures in sufficient detail that the study could be replicated by someone who read the report (Sidman, 1960). In accordance with this principle, outcome studies should describe in detail the therapeutic interventions used with the subjects in the study. However, the factors involved in therapeutic interventions are complex and are not always easily identified (Jacobson & Baucom, 1977). Because of this, it is probably unrealistic to think that therapeutic results can be replicated simply

from descriptions of therapeutic interventions. Nevertheless, an attempt should be made to describe treatment variables in both practical and theoretical terms. Particularly important to include in such a description are the actions of therapists which are designed to promote change. Thorough descriptions of this sort should be sufficiently informative to allow readers to draw their own conclusions as to the salient features of the therapy.

Feasibility for widespread application. Probably the simplest way to assure that a treatment is feasible for widespread application is to show that the treatment being studied is typical of treatment in an ongoing clinical service program (e.g., Sloane et al., 1975). This in itself demonstrates the workability of a treatment program. In contrast, treatment that is done as part of a special research project may not be practical to implement in a clinical service program. Patterson and Reid (1973) suggest that authors provide data on the amount of professional staff time devoted to treatment. Most of the autism outcome studies described here involve special research projects and none of these report data on investment of professional time (e.g., Hemsley et al., 1978; Lovaas et al., 1973). Lovaas makes a point of the fact that treatment facilities other than his are unlikely to get the same results because they do not have staff familiar with discrimination learning procedures. If true, this decreases the value of his work from the standpoint of the development of treatment procedures, since it indicates that his treatment could not be as successfully applied by others.

Subject Selection and Description

Diagnostic issues. One of the most serious impediments to in-

terpreting much of the literature on the treatment of autistic children is the failure of many authors to report sufficient diagnostic information to permit the comparison of subjects with those in other studies. There are problems in comparing any two children diagnosed as autistic because of the heterogeneity of the children for whom the diagnosis is appropriate. However, some relevant dimensions of the disorder can be identified which should be covered by authors wishing their work to have a more general application. Research evidence suggests that a meaningful distinction can be made between psychoses with an onset prior to three years and psychoses with an onset after three years, usually later than five years (Kolvin, 1971). The population in the proposed study will be Kolvin's early onset group. This group includes children with various labels, among them "autistic", "childhood schizophrenic", "childhood psychotic", and others. While arguments have been made for distinguishing sub-groups within this population (e.g., DeMyer, Churchill, Pontius & Gilkey, 1971; Mahler, 1952; Rimland, 1964), no such sub-groups have yet been identified which have been shown to provide more information concerning etiology prognosis, or treatments of choice than do quantitative measures taken within the group as a whole. Rutter (1972) argues persuasively against the utility of subclassification of psychotic syndromes of childhood at this point in our knowledge of the disorder (see also Schopler & Rutter, 1978).

In reviews of the literature on diagnosis, Rutter (1971, 1978) has reduced to four the criteria that are necessary and sufficient for the diagnosis of autism, used as it will be here to refer to the early onset psychosis group. They are: (1) an onset of the disorder before 30 months of age; (2) a lack of normal social relationships; (3) a delay or

abnormalities in language development; and (4) the presence of ritual or compulsive phenomena. Studies of the treatment of autism should provide data and descriptive information relating to each of these criteria. The studies by Goldfarb et al. (1966) and Wenar et al. (1967) are notable in their failure to provide such information.

Obtaining a representative sample. While the ideal way to select subjects for a treatment study would be to randomly select subjects from the target population, this is not practical because there is no way to gain access to an entire population. An adequate alternative is to study consecutive referrals which fit the specified diagnostic criteria (Patterson & Reid, 1973). Such a method eliminates most of the factors which might make a non-random selection of subjects unrepresentative of the target population. This will depend to some extent upon the way the treatment service gets referrals. However, consecutive referrals do have the advantage of drawing a fairly representative sample of subjects that an agency is likely to see. Surprisingly, of the studies of autism outcome reviewed here, only Hemsley describes her methods of obtaining clients.

Influence of selection factors. Sometimes treatment studies will purposefully set selection criteria which result in their having subjects who represent a subgroup of autistic children. This can be a meaningful and informative way to conduct a study (Schopler & Rutter, 1978). However, it is necessary to take these selection factors into account in interpreting the results of the study. For instance, Hemsley et al. (1978) worked only with children whose non-verbal IQs were greater than 60. This places them in the upper one-third of autistic children on non-verbal IQ (cf. DeMyer, Barton, DeMyer, Norton, Allen & Steele, 1973).

There is some evidence that autistic children with higher IQs respond more favorably to treatment. Several follow-up studies have indicated that the child's assessed level of cognitive functioning is the best predictor of his social and intellectual functioning at a follow-up evaluation several years later (Davids, Ryan & Salvator, 1968; DeMyer et al., 1973; Havelkova, 1968; Lotter, 1974; Rutter, Greenfield & Lockyer, 1967; Treffert, McAndrew & Driefurst, 1973). Furthermore, DeMyer, Barton, Alpern, Kimberlin, Allen, Yang and Steele (1974) found an interaction effect of treatment with IQ. Among autistic children in their sample whose IQ score was greater than 50 at an initial evaluation, those who received treatment had significantly higher IQ scores at follow-up than those who did not. Among children whose IQ was less than 40, there was no differential effect of treatment. While methodological problems limit the conclusiveness of this finding, it does suggest that IQ data are particularly important in the interpretation of treatment outcome studies. For instance, it indicates that Hemsley's results may be better because of the selection of higher functioning children. Findings from her study cannot be interpreted to apply to more severely retarded children.

Selection factors also need to be considered in the design of control groups. For example, in the study by Wenar et al. (1967), groups in residential placement are compared with a group in day treatment. We might expect the residential groups to have more severely disturbed and retarded children since they were chosen for such a placement. This would lead us to expect that they would show less progress than the day treatment subjects. This does in fact occur. As a result, the differential effects of treatments are confounded by the differential selection

factors in Wenar's study.

Measures of Therapeutic Change

Choosing measures. The issue of how to measure therapeutic change is made complex by the nature of therapeutic goals and the requirement that the evaluation of treatment effects be an objective process (Sloane et al., 1975). While for some individuals or systems of individuals (e.g., families) therapeutic changes can be viewed in terms of quantitative behavioral changes, such as amount of social contact or number of fights, changes in others are not so easily assessed. For example, it is difficult to quantify the emotional acceptance of, and adjustment to, a situation that is not likely to change or may not be desirable to have changed. This would pose no problem for treatment research if it were satisfactory to use the clients' evaluation of treatment success or even the therapist's judgment of success as an outcome measure. However, both of these methods of evaluation are subject to bias because of the investment of the evaluator in treatment success (Sloane et al., 1975). This sort of problem is compounded in a group study by the need to find measures that apply to all of the subjects in the study.

One type of outcome measure that might be used in a treatment study of autism would be the sort of measure that is used in follow-up studies. These include global assessments of social adjustment, IQ and other developmental data, and information on placement (DeMyer et al., 1973; Lotter, 1974; Rutter et al., 1967). A demonstrable treatment effect upon these measures taken when subjects had reached late adolescence or adulthood, would be an impressive criterion for treatment success since these are the indicators of overall functioning on which autistic

children are known to do poorly at the follow-up. Good outcomes on these measures would be convincing even without an untreated control group, as long as subjects' characteristics were adequately described at an initial evaluation and the children appeared typical of the early onset group. None of the outcome studies reviewed here claims such remarkable success, however.

More subtle effects on these measures would have to be demonstrated against an untreated control group. Goldfarb et al. (1966), Lovaas et al. (1973) and Ney et al. (1971) use data on intellectual functioning but have no untreated control groups. Hemsley et al. (1978) found no differences on developmental measures between treatment and control groups over six and eighteen month intervals. Assuming that treatment could have an effect on such measures, it seems likely that differences on them would have to be examined over long periods of time to become significant. To carry out such a study, one group would have to be denied the treatment hypothesized to be effective for several years during their childhood and adolescence. To do this is unacceptable on ethical grounds. Thus, most treatment studies involve shorter treatment periods.

The evaluation of shorter treatment periods requires outcome measures which may be significant in two ways. First, they may be measures of goals that are worthwhile in themselves. Most such measures are seen as fairly directly reflecting the alleviation of suffering. An example from the literature on autism is the reduction of self-injurious behavior (Lovaas et al., 1965). The second way in which measures may be meaningful is by their hypothesized relation to more direct measure of outcome success. Thus, for example, in a review of behavioral treatment

of autism, Leff (1968) states:

> None of the investigators whose work was reviewed here would claim that they have cured their subjects. But many can justifiably state that they have equipped their subjects with several of the basic skills and habits necessary for the most rudimentary of adjustments to their social environment. (p. 406).

Some of the outcome measures reviewed in this proposal are justified in this way. It is important in evaluating such measures to consider the degree to which they really do relate to important positive changes in an autistic child's life. Such a link cannot be taken for granted even though we may have no way to objectively test it.

With their focus on changes in specific behaviors, behavior therapists are particularly prone to over-rating the adaptive significance of certain indicators of change. For instance, much of the early behavioral work with autistic children focussed on training speech. In an article in Science, Lovaas, Berberich, Perloff and Schaeffer (1966) justify the emphasis given to speech training by noting Eisenberg and Kanner's (1956) oft-quoted finding that autistic children who developed no useful speech before age 5 invariably had poor outcomes. However, it is false to infer from this finding, as Lovaas seems to, that one can significantly improve a mute child's prognosis by teaching him some useful speech before he is five. [Lovaas acknowledges the over-emphasis given by his program to speech training in his follow-up study (Lovaas et al., 1973)]. The relation between speech training and long-term prognosis remains an empirical issue, and is a rather difficult one to assess for the same reasons that it is difficult to objectively evaluate any treatment effects over a long period of time.

One way to circumvent the problem of possible lack of significance of certain behaviors as outcome measures is to use global ratings of

overall behavior. Goldfarb et al. (1966) and Wenar et al. (1967) both adopted this strategy. Goldfarb's measure was a four point rating scale of ego functioning. Wenar's group used the BRIAC, which yields global ratings in five areas of ego functioning. Each of these groups states they found the scales to be reliable although neither offers data on this issue. A serious flaw with such scales is their susceptibility to observer bias. Global ratings are much more likely to be influenced by the observer's expectations than are more specific behavioral measures (Kent & Foster, 1977). In treatment studies, it is difficult to keep observers blind to treatment conditions unless audio or video tapes are used. There is no indication that either Goldfarb or the Wenar study employed such devices or dealt with the problem of observer bias in any other way. Thus, their ratings cannot be viewed as objective measures of treatment change.

Evaluating change in several behaviors. Patterson and Reid (1973) suggest a solution to the dilemma posed by the possible irrelevance of changes in specific behaviors and the lack of objectivity of global measures. They advocate the evaluation of change in several areas of behavior, using multiple outcome measures. This approach permits the examination of several child behaviors, both desirable and undesirable. Following Rutter's criteria, social relating, communication, and psychotic behaviors should all be examined in a study of treatment effects with autism.

The use of multiple outcome measures also opens up the possibility of examining changes in family functioning that are a result of treatment. There are two types of changes in families which are of interest. The first includes changes in the parents' ability to produce desired

changes in their child. The second type of change focusses on the issues of the family's adaptation to the stress of having an autistic child. Of the studies reviewed here, only Rutter and Bartak (1973) and Hemsley et al. (1978) include measures dealing with parental and family issues. The present study includes such measures as well.

Behavioral observations. Lovaas et al. (1973) made a significant methodological advance in producing a behavior observation recording system which provided data on time spent engaged in five types of behaviors, and for which inter-rater reliability could be examined. The five categories of behavior were appropriate speech, appropriate play, social non-verbal behavior, self-stimulation, and echolalia. They employed an Esterline-Augus multi-pen recorder to obtain both frequency and duration data on the incidence of these behaviors. Using ratings of video-tapes which were done by raters blind to the stage of treatment, they were able to demonstrate a high degree of inter-rater reliability. Theirs is the first study in the autism treatment literature to employ a behavior coding system which could obtain comparable quantitative data among a group of autistic children.

The Lovaas study is oriented to changes occurring in the clinic where the children were treated. The multi-response recordings were carried out in the clinic and involved interaction with clinic staff. While this provides a standardized setting for the observation of behavior, the setting is quite different from the one in which changes are most important, usually the home. In a review of assessment literature, Mischel (1968) presented evidence that behavior varies consistently across different situations. Wahler (1969) has demonstrated that a child's behavior differs in different natural environments and some of

Lovaas' own work has shown that treatment effects may be particularly situation specific in autistic children (Lovaas et al., 1965).

Observation in the home. Hemsley et al. (1978) deal with the problem of situation specificity of behavior by carrying out behavior observations in the homes of the children in their study. Furthermore, their observations were focussed on both parent and child behaviors. They coded a range of behaviors, including categories covering important aspects of autistic behavior. Their work is commendable because of its emphasis on change in parents' behavior and because they made their observations in the subjects' homes. Furthermore, their use of a variety of measures enabled them to look at therapeutic changes in different ways. As is noted above, this contributes to the validity of the findings and should be a feature of all treatment studies.

While Lovaas et al. (1973) conducted their observations in a clinic setting, some of their data bears on the interpretation of observations of parent and child behaviors in the home. They observed children in three types of stimulus settings. In one, the child was alone in a playroom. In another, the Attending condition, an adult was with the child and attended to him visually, but did not initiate interaction with the child. In the final setting, the Inviting condition, the adult made active attempts to engage the child in interaction and toy play and to encourage communication on the part of the child. Lovaas' group presents data for four children comparing appropriate verbal behavior in the Attending and Inviting conditions. All of the children show greater change in the Inviting condition. Two of the children show no change in the Attending condition but change in the Inviting condition. Although these data are available for only one behavioral category and four

children, it points out that to a great extent behavioral observation measures reflect changes in a child's interaction with others and cannot be viewed independently of the social context in which that behavior occurs.

The effect of the social environment on behavioral observation measures becomes even more important when such measures are applied to a natural environment such as the home. It is impossible to make the social context constant in a home environment. In fact, it is not desirable to do so. The behavior of the other people, most importantly the adults, becomes a variable that influences the assessed behavior of the child just as it influences the behavior of the child when he is not being assessed. In the present study, both parent and child behaviors were coded independently and viewed as outcome measures. Nevertheless, child and parent variables influence each other in a way that will not be entirely analyzable. Thus, both parent and child observation measures should be viewed as reflecting interactive behaviors rather than isolated responses by one or another individual. Therapeutic changes assessed on behavioral observation measures reflect family system change as much as individual changes in the child or his parents.

Reliability of behavioral observation measures. It is important for researchers using behavioral observation procedures to assess and report data on the inter-rater reliability of these measures. Kent and Foster (1977) have shown how the method for computing reliability can affect the estimate of reliability obtained. Reliability estimates should be carried out on the statistics that will be used as dependent variables in a study (Johnson & Bolstad, 1973; Kent & Foster, 1977). Hemsley et al. (1978) state that inter-rater reliability was assessed on

their measures and found to be adequate. However, unlike the Lovaas study, they neither report these data nor indicate how reliability was assessed .

Observer bias and subject reactivity. In the Hemsley study the therapists themselves appear to have carried out the behavioral observations. There are two ways in which this might have a confounding influence on the results. The first is that therapists, who have a strong investment in, and expectation of, positive therapeutic change, might tend to spuriously rate in the direction of such change (Scott, Barton & Yarrow, 1967). However, more systematic studies suggest that behavioral observation data are relatively free of expectation bias (Kent & Foster, 1977). This is fortunate because it is difficult to keep observers in homes unaware of a family's involvement with treatment.

A second, more serious, confounding factor in using therapists as observers is the possibility that subjects will behave differently in the presence of their therapists. This is one form of the general issue of reactive effects in the presence of any observer. Such effects have been found in systematic research on behavioral observations (Johnson & Bolstad, 1973; Kent & Foster, 1977). However, the effects have generally been found for only a few of several behavior categories. Further, these effects have been unpredictable from study to study (Kent & Foster, 1977). This makes it impossible to deal with them in a systematic way. However, it seems likely that using a family's own therapists as observers would increase the chance for reactive effects, and should be avoided if possible. In the study reported here, the observers were individuals who are not involved in the treatment of the family. While

this does not eliminate the possibility of reactive effects, it should reduce their influence.

Interviews. Behavior observation measures can reflect changes in the central characteristics of autism and the behavior of parents with their autistic children. Few treatment programs claim to be able to cure autism, however, and autistic children generally show poor social adjustment and require continued care throughout their lives (Lotter, 1978). Treatment programs which make the family the focus of intervention deal with a variety of problems that families of autistic children face (Marcus, 1977; Rutter & Sussenwein, 1971; Schopler & Reichler, 1971). These include the special problems that their children present, the reaction of outsiders to their child's problems, and discord among family members resulting from the child's special problems (Holroyd & MacArthur, 1976). To evaluate a program which focussed on such problems, it is necessary to develop measures for these issues.

Hemsley et al. (1978) report some data relating to this issue. They obtained ratings of social disruption and deviance on the part of the child as determined from interview data. However, they do not discuss in detail the nature of this information or how it is obtained. They also report that they obtained measures of parent attitudes and coping skills but do not include this information in their report.

The measure of family adjustment developed for the present study is partially based on the assessment interview used by Sloane et al. (1975) in an outcome study on psychological treatment in an adult outpatient psychiatry clinic. These authors had clinicians, who were blind to treatment conditions, interview subjects before and after treatment (or a non-treatment control period). The interviewers rated the severity of

the subjects' problems on a 0-4 scale after each interview. However, no reliability assessment was carried out on the ratings. This too frequent omission was avoided in the present study by having the ratings made from audio tapes of the interview by raters other than the interviewer. This made it possible to assess reliability, and also keep raters blind as to subject's treatment condition.

Issues of Overall Design

The nature of controls. The most problematic area of methodology in the design of outcome studies involves the resolution of issues concerning controls for effects of factors other than treatment. Both Browning (1971) and Lovaas et al. (1973) offer pre-treatment and post-treatment data on their subjects but have no control for the effects of maturation and other factors that could not be considered part of treatment. Further, neither test the statistical significance of changes they report. Both controls and significance testing are necessary for the demonstration of treatment effects in a group study.

The Lovaas study was not designed as a group study originally. The primary means used in this study to demonstrate the impact of his treatment, as opposed to other factors, is a replication of the treatment and behavioral effects in two children who had regressed after being placed in institutions. He treats this as an ABAB design. There are several problems with such an analysis. First, the ABAB design is a single subject design as Lovaas employed it, so the control applies only to those subjects for whom such a replication was carried out. Second, the second A condition involved far more than simply a reversal of treatment as required by ABAB designs (Birnbrauer et al., 1974). In fact, it

was an entirely different social setting than in both conditions B and the first condition A. Third, viewing the second condition A as a reversal of the treatment conditions seems to have been determined by the effects rather than the condition. If the children had not regressed, it is likely that their continued improvement would have been considered a reflection of the value of the treatment as it was in the case of children whose parents kept them and applied behavioral techniques with them. Thus, the replication does not provide a satisfactory demonstration that effects are specifically due to treatment.

Hemsley et al. (1978) evaluated two control groups which they considered to provide treatment comparisons with their experimental treatment group. An inspection of the description of the nature of treatment in these groups suggests that there is little value in considering them to be treatment comparison groups. Subjects in one group received a variety of unspecified treatments and some received no treatment at all. Subjects in the second group were seen by the same clinic that provided the experimental treatment but "because of distance or date of referral were seen only occasionally as out-patients" (Hemsley et al., 1978). It appears that the controls used in this study cannot even be considered an adequate attention placebo control (cf. Jacobson & Baucom, 1977). The control groups in the Hemsley study are best conceived as no-treatment controls.

The study reported here employed a design in which changes are examined during a no-treatment period and then again during a treatment period on the same subjects. Evaluations were carried out at the beginning and end of the control period and again at the end of a period of treatment. This is a modification of the design used by Patterson

and Reid (1973), who established a baseline rate on their measures and then assessed change at various points during and after treatment. The essential difference between their design and the one used here is that the latter has a control for the effects of time that are not due to treatment, such a maturational factors.

Follow-up. It is a standard methodological requirement that outcome studies provide follow-up data on subjects sometime after they have terminated treatment (Strupp & Bergin, 1969). This is important in establishing that treatment effects do not simply reflect transient responses to intervention. This is a very important issue with autism as the studies by Browning (1971) and Lovaas et al. (1973) indicate. Both noted regression in children who did not continue to receive treatment.

There are problems with the design of follow-up evaluations for autistic children. Autistic children are rarely cured, either in or out of treatment. They suffer from a developmental disability. They and their families are generally dealing with the disorder throughout their lives. Therefore, treatment efforts generally continue indefinitely even though the most intensive work is often done early. Thus, it is often impossible to assess these children after treatment. Another problem is that it is unethical to deny control groups treatment throughout a follow-up period.

It would appear that the best possible sort of follow-up evaluation for autistic children would be an assessment of the end of an extended period of time such as 12 to 18 months. Such a follow-up evaluation could not be compared with a control, but would examine whether or not children had regressed since the final treatment evaluation. This

approach is taken by Hemsley et al. (1978). While such a design is not conclusive concerning long-term treatment effects, it appears to be the most satisfactory method ethically and methodologically.

The Problem

One of the first groups which based treatment procedures on the use of parents as co-therapists with their own autistic child was the one led by Schopler and Reichler (1971). These authors conceptualized the basic disorder of autism as being perceptual inconstancies involving impairments in language and communication. They hypothesized the causes of the disorder to be some form of brain abnormality. This view separated Schopler and Reichler not only from psychodynamic theorists on autism (e.g., Bettelheim, 1967), but also from the learning theorists who carried out most of the behavioral research on autism mentioned above. The latter generally viewed autism as the result of the failure of the environment to take on acquired reinforcing properties for autistic children (Ferster, 1961). This difference of etiological view led to differences in treatment strategy. While learning theorists have focussed on restructuring reinforcement contingencies in reaching autistic children, Schopler and Reichler gave more emphasis to the need for psychoeducational programming which matches the child's level of skill in various developmental areas.

Schopler and Reichler's developmental therapy approach is based on a social interactional model of factors influencing a child's development:

> With the normal child, the parent tends to gear his expectations to the child's level. Under such conditions the parent-child interaction tends to be reciprocal. By

> and large, the parent shapes his child's behavior around parental expectations. The child in turn has an effect on the parent's behavior. (Schopler & Reichler, 1971, p. 206).

These authors suggest that the unusual behavior of the children tends to extinguish parenting efforts. Parents are confused by the child's lack of responsiveness and bizarre behavior. As a result, they are unable to set appropriate expectations for their child or to interact with him in a meaningful way. This parental confusion adds to the child's difficulty in developing social competence and other developmental skills.

Schopler and Reichler's treatment program is designed to reduce parental confusion by actively engaging them in the developmental training of their child. Two psychoeducational therapists are assigned to each family. One works primarily with the child, developing training activities and demonstrating these activities for the parents. The activities are chosen on the basis of their appropriateness to the child's developemental level in various areas of skill. The second therapist serves as a parent consultant and discussed the programming ideas with the parents as they observe the first therapist's demonstration through a one-way mirror. The parents are asked to carry out the programming suggestions daily at home and return to the clinic regularly to demonstrate problems and progress in their work. The parent consultant also helps parents to develop behavioral management procedures to use at home.

Principles employed by the child therapist and taught to parents are based on behavioral and developmental theory. Parents are taught to use reinforcement and punishment effectively. An important part of this task is giving parents an understanding of their child's ability to

interpret messages of various levels of complexity. Parents are taught to communicate with the child at a level that is meaningful to him. Other aspects of teaching skills which are emphasized are pacing work at a speed that the child can handle, appropriately arranging and presenting materials in the teaching setting, the use of gestures and demonstrations of tasks, and adapting tasks to fit the needs of the child. The use of time-out for inappropriate behavior is also trained.

The focus of the home program activities is on three related areas: (a) human relatedness; (b) competence motivation; and (c) developmental skills (including cognitive and perceptual-motor functions) (cf. Schopler & Reichler, 1971; Schopler & Reichler, 1979). The development of social responsiveness and competence motivation is seen as basic to increasing developmental skills. Therefore, these areas are seen as important in the early phases of treatment. Parents are taught to impinge on their child and to give him clear messages concerning the acceptability and appropriateness of his behavior. Through training, parents and children are taught to be more responsive to each other. Programming geared to the child's level of skill is viewed as the key to competence motivation. Aims in this area "include helping the child to develop pleasure and interest in increasingly organized exploration and use of toys and educational materials" (Schopler & Reichler, 1971, p. 215). The goals of developmental skill building are longer range goals and are, therefore, not as salient for the present short-term study. In summary, the early goals of the home program aspect of the program are to increase parental skill in guidance, increase the child's relatedness and appropriate use of objects, and to decrease the child's autistic behavior.

The goal of the parent consultant's work with parents around

problems occurring in the home is to increase the child's adaptation to the home environment while decreasing the debilitating effects of the child's psychotic behavior on the child and his family. Social learning principles and practical suggestions are offered to parents to help them manage their child at home. Home visits are sometimes made as part of treatment, depending on the therapist's perception of the need for them.

Until recently, evidence of the effectiveness of Schopler and Reichler's program had come mostly from clinical impressions and the enthusiastic support of parents, which resulted in the program's being adopted on a state-wide basis in North Carolina as Division TEACCH (Treatment and Education of Autistic and related Communications handicapped CHildren) (Reichler & Schopler, 1976). More systematic attempts to assess treatment effects have been carried out recently. A questionnaire concerning the effects of treatment was sent out to parents who have been involved with the program. The questionnaires indicate a favorable response to the project (Schopler, Mesibov, Devellis & Short, in press). Marcus, Lansing, Andrews and Schopler (1978) have used an observational rating scale to evaluate changes in parents' teaching competence and the child's on-task behavior during the first six to eight sessions of therapy, termed the "extended diagnostic" period. They used observations of parents in the clinic at the beginning and end of this period. Their findings indicated that dramatic increases in parental teaching competence and on-task behavior of the child occurred with treatment.

The study reported here is a further attempt to develop sensitive and valid ways to evaluate the treatment of autistic children in the TEACCH program. The study was designed to deal effectively with the

methodological issues discussed above.

The study evaluates the effects of an ongoing clinical service program whose feasibility is evident in its successful implementation (Reichler & Schopler, 1976). Subjects were chosen by taking consecutive referrals to one of the clinics in the program, and represent a varied group of autistic children. Evaluation took place in the homes of the children studied. A variety of measures were used, including behavioral observations, interviews, and questionnaires. Measures were designed to address a variety of issues concerning child, parental, and family functioning. A good deal of effort was made to assure that the main measures were reliable and unbiased. Assessment was carried out during a waiting period prior to treatment to provide a control for change without treatment.

Despite the methodological strengths, there are some ways in which the design of the study is not optimal. If it could be assured to be comparable to the treatment group on several relevant variables, an independent control group would be preferable to the use of families as their own control in a group design. It would also be optimal to have formal evaluation of the validity of the measures. This is lacking in the present study. Finally, with behavioral observation data, more data points would be preferable to the three for each family used in the study. Despite these weaknesses, the study provides convincing data concerning the effects of the Schopler-Reichler treatment model.

Hypotheses

The purpose of the present study was to develop and implement an objective procedure for evaluating the efficacy of Schopler and

Reichler's treatment program.

Four main hypotheses based on treatment goals were investigated:

1. Parents would show an increase as a result of treatment in the degree to which they are actively involved with their child during time spent with him.

2. The autistic children would show an increase due to treatment in the amount of time they are either engaged in appropriate play or work, or are interacting with other people.

3. The autistic children would show a decrease due to treatment in the amount of time engaged in inappropriate play with objects and self-stimulatory behavior, and in the time spent not interacting with either objects or people.

4. The family would show an increase due to treatment in their ability to handle the child's problems in the home without sacrificing other important aspects of family life.

II. METHOD

Overall Design

Measures providing data for dependent variables were administered during home visits which occurred at three times for each family in the study (see Figure 1). Each home visit comprised a standard set of procedures which is described in detail below. The visits occurred at the beginning and end of a waiting period prior to the full-day diagnostic evaluation which marks the beginning of therapy, and after six to eight one to one-half hour therapy sessions. The waiting period provides a control for change without treatment. The independent variable was the presence or absence of therapy and the dependent variables were scores on the measures administered during the home visits.

Two major measures were used on each visit. The first involved direct observations of parent and child behaviors. A ten-second interval coding system was used to quantify the occurrence of five parent and nine child behaviors. The second main measure was a rating of interviews with mothers, which focussed on stress and coping in the families of the autistic children. Clinicians made ratings from the interviews on seven dimensions of family functioning. Two questionnaires were also used. One solicited mothers' ratings of the same seven issues of family functioning as were rated by clinicians. The other obtained both parents' opinions of the effects of treatment.

FIGURE 1

DESIGN OF THE STUDY

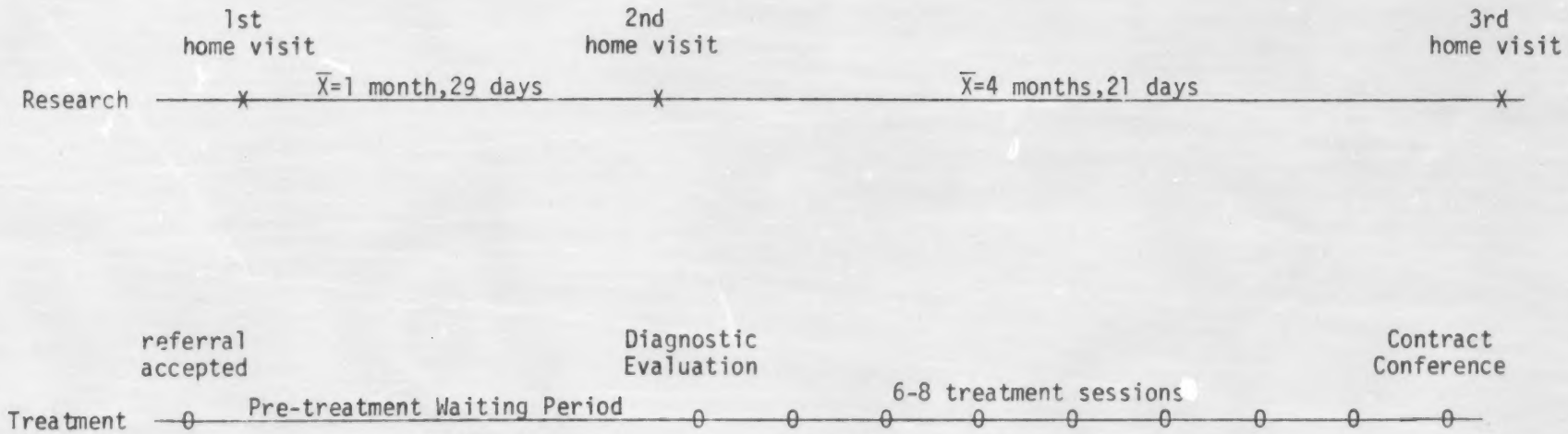


TABLE 1

CHARACTERISTICS OF SUBJECTS
(N=15)

	Mean	Range
Age	4 yrs., 8.3 mos.	2 yrs., 4 mos.- 7 yrs., 6 mos.
Social Class (Hollingshead Index)	4	1-5
IQ (based on Merrill- Palmer (7), Bayley (6), and WPPSI (2))	54.0	9-106
Social Quotient	57.9	25-97
Sex	12 males	3 females

Behavioral Characteristics

Features present in all subjects:
1. Delay in language development
2. Abnormal social relations
3. Some form of ritualistic or compulsive behavior
4. Onset of problems before 30 months of age

Features present in some, but not all, subjects:
Mutism
Echolalia-delayed and immediate
Perseverative use of language
Motor stereotypies
Need for sameness in environment
Ritualistic behaviors (e.g. lining up objects)
Bizarre use of objects (e.g. fascination with spinning objects)
Preoccupation with tactile or olfactory stimulation
Avoidance of eye contact
Tactile defensiveness
Uneven pattern of intellectual skills
Hyperactivity
Distractibility

Subjects

Fifteen psychotic children and their families were followed during the course of the study and completed the data collection procedures. A series of consecutive referrals of appropriate cases were chosen for the study. A case was considered appropriate if the child was under nine years old, referral information indicated a high likelihood that he or she was autistic, and the family appeared likely to participate in treatment. Twenty-four children and families were chosen for the study initially. One family moved out of the state before treatment began. Another family decided against involvement with the program before they had made any visits to the clinic. Two children were dropped from the study because they were obviously not autistic when the first research visit was made. Three families discontinued contact with the program after some contact because of inability to obtain transportation on a regular basis. Two families dropped out due to apparent dissatisfaction with, or disinterest in, the treatment program.

The characteristics of the fifteen subjects who completed the study are listed in Table 1. The children ranged in age from 2 1/2 to 7 1/2 years. The mean IQ of the group was 54 with a range from 9 to 106. These scores were based on the Merrill-Palmer Scale of Mental Tests, the Bayley Scales of Infant Development, and the Wechsler Preschool and Primary Scale of Intelligence. Ratio IQ's (Mental Age/Chronological Age X 100) were used in most cases to obtain scores from the Merrill-Palmer and Bayley. The IQ scores were comparable to the scores generally found in other studies of autistic children (e.g., DeMyer et al., 1974). There were 12 boys and 3 girls included

in the final sample. This ratio is also typical of populations of autistic children.

Of the fifteen children, all but three had an autism rating of two or greater on TEACCH's Clinical Rating of Psychosis. The latter is a clinical rating of the degree of autism made at the child's initial diagnostic evaluation in the program (Reichler & Schopler, 1971; cf. Schopler, Reichler, DeVellis & Daly, in press). The rating of two or greater for all subjects was the goal of the selection procedure. However, since the diagnostic evaluation did not occur until a family had already completed two of the three home visits, it was not possible to make this an absolute criterion for selection. The three children who did not obtain this rating did not differ from the other children in any systematic way. All of the fifteen children showed Rutter's four essential criteria for the diagnosis of autism (Rutter, 1978): 1. Abnormality or delay in language development; 2. Abnormal social relations; 3. Some form of ritualistic or compulsive behavior; 4. Onset of the disorder before 30 months of age. In addition, at least some of the children had the following characteristics: mutism, echolalia, irrelevant use of language, self-stimulatory behavior, need for sameness in the environment, avoidance of eye contact, and an uneven pattern of intellectual skills.

There was a predominance of families in the lower two social classes of Hollingshead's two-factor index (Hollingshead & Redlich, 1958). Eleven of the fifteen families were from social classes IV and V. This is typical of the TEACCH population (Schopler, Andrews & Strupp, 1979). Eight families were White, six were Black, and in one the mother was Oriental and the father Puerto Rican.

In eleven of the fifteen families the father was living in the home. Eight of these fathers regularly attended treatment sessions. Only two fathers did not come to any treatment sessions. In one of the families with no father present, a grandfather was present and attended treatment sessions regularly. Some of the siblings of the autistic children attended some treatment sessions, but their attendance was sporadic.

Procedures

Home visits were scheduled for most families within a week after their referral phone call with TEACCH, a week before their diagnostic evaluation at TEACCH, and after the extended diagnostic period of treatment at TEACCH, as defined above. The waiting period had a mean duration of 1 month, 29 days, and the treatment period had a mean length of 4 months, 21 days (see Figure 1).

Behavioral Observations

During each visit, behavioral observations were made over a period of 1 1/2 hours. The family was asked to keep the child in an area in which he would normally be during the particular time of day. The time and location of the observations was kept the same for each visit with a given family to as great an extent as was possible. The family members present for the observation were also kept constant as much as possible. The conditions for the observations were generally quite consistent, although there were two families who moved to new homes during the study. The family was asked to keep the television off during the observation period. They were told to do what they usually do when they have a chance to spend some time with their

child. Observers did not interact with the family during the observation period.

The behavioral observations were designed to elicit parent-child interactions typical of the given family. Because the parents were asked to be with their child during the observation time, the observations do not evaluate the amount of time spent with the child. Instead, they offer a way to evaluate the quality of interactions when the parent is with the child. As with all naturalistic observation in which the subjects know they are being observed, it is possible that the parents may alter their behavior in reaction to the presence of observers. The instructions for the family during the observation period were designed to encourage the parents to do what they usually do with their child. Parents generally seemed to comply with this demand. However, it is not possible to rule out entirely the possibility that reactive effects influenced the parents' behavior (see Johnson & Bolstad, 1973, for a discussion of this issue).

Two observers were present for 39 out of the 45 visits to assure inter-rater reliability. The author served as an observer on all visits while one of two research assistants, both of whom were blind to the hypotheses, served as the other observer.

Fourteen behavior categories were coded for occurrence or non-occurrence during ten-second intervals. The categories are listed below and are described in detail in Appendix A. Raters observed for ten seconds, and then had ten seconds to code, marking "1" to indicate the presence of a behavior during the previous ten-second period. Practice codings were done from video-tapes, live clinic sessions, and three home visits before the study commenced. Raters practiced for

several hours on tapes and live clinic sessions before being used in the study. On home visits, observers coded behavior for 5/6 of the total observation time. They were rating simultaneously 2/3 of the time during each segment so that reliability could be checked for most of the data.

The behavior coding system included the following categories of parental behavior: Verbal Guidance (VG) (including instructions, prompts, and reinforcement), Gestural Guidance (GG), Physical Guidance (PG), Social Attention (SA), and Aversive Communication (AC). Child behavior categories included Social Approach (A), Social Interaction with Adults (SIA), Social Interaction with Children (SIC), Appropriate Play or Work (PW), Meaningful Communication (MC), Echolalia (EC), Self-stimulation (SS), Repetitive Object Play (RP), and Sustained Non-interaction (NI).

Five additional variables were derived from the behavior observation categories for the purpose of testing three of the main hypotheses and doing exploratory analyses. Selected behavior categories were summed to obtain PAR, APP, INA, the three variables used to test the first three hypotheses of the study. They represent, respectively, parent involvement, appropriate child behavior, and inappropriate child behavior. Guidance (G) is a category which was scored by computer in all intervals in which one or more of the three guidance categories was coded. Social Attention-or-Guidance (SAG) was scored by computer whenever any parent behavior category was coded.

Behavior coding reliability. The reliability of the behavior coding scheme was measured in two ways, corresponding to two different statistical treatments of the data. For analyses involving the total

number of occurrences of a behavior in each session, Pearson Product-Moment Correlations were calculated on the session totals for each rater (Hayes, 1973). For analyses involving interval by interval correspondence of occurrences of behaviors (e.g., the conditional probabilities discussed below), percentage agreement on occurrence was used (Kent & Foster, 1977).

The Pearson's r and percentage agreement scores for all behavior categories, including categories which are composites of the categories coded, are listed in Tables 2 and 3. Table 2 shows the scores for the agreement of Rater #2 with Rater #1, who is the author. Table 3 shows the scores for the agreement of Rater #3 with Rater #1. The Pearson's r score represents a correlation of session totals over all sessions rated. The percentage agreement score is a mean of percentage agreement scores for each session.

For the session totals, a Pearson's r of .80 or greater was considered to be an indication of adequate reliability. Both raters attained this level of agreement on 15 of the 19 categories listed. In fact, agreement was greater than .95 on most categories. The categories used in testing the main hypotheses, PAR, APP, and INA, were all over this mark for both raters. Categories which did not reach the criterion of .80 for both raters were not subjected to further analyses, although the data on them was included in composite categories of which they were part. The categories excluded from further individual analyses were Physical Guidance, Aversive Communication, Approach, and Echolalia. These were all categories which occurred in less than 5% of the intervals overall.

It is evident from a comparison of the percentage agreement

TABLE 2

INTER-RATER RELIABILITY FOR BEHAVIOR CODING:
RATER #2 WITH RATER #1

	Pearson's r	% Agreement (mean of scores for each session)
Verbal Guidance (VG)	.95	.56
Gestural Guidance (GG)	.90	.43
Physical Guidance (PG)	.80	.28
Social Attention (SA)	.94	.52
Aversive Communication (AC)	.41	.08
Social Approach (A)	.49	.19
Social Interaction w/Adults (SIA)	.98	.79
Social Interaction w/Children (SIC)	.96	.30
Appropriate Play and Work (PW)	.97	.62
Meaningful Communication (MC)	.99	.33
Echolalia (EC)	.81	.11
Self-stimulation (SS)	.99	.18
Repetitive Object Play (RP)	.99	.15
Sustained Noninteraction (NI)	.99	.62
PAR	.97	*
APP	.99	*
INA	.99	*
Guidance (G)	.96	.58
Social Attention or Guidance (SAG)	.99	.86

*It is impossible to meaningfully assess interval-by-interval agreement on categories which are sums of other categories.

TABLE 3

INTER-RATER RELIABILITY FOR BEHAVIOR CODING:
RATER #3 WITH RATER #1

	Pearson's r	% Agreement (mean of scores for each session)
Verbal Guidance (VG)	.97	.62
Gestural Guidance (GG)	.99	.50
Physical Guidance (PG)	.74	.43
Social Attention (SA)	.96	.60
Aversive Communication (AC)	.00	.10
Social Approach (A)	.88	.39
Social Interaction w/Adults (SIA)	.99+	.76
Social Interaction w/Children (SIC)	.96	.44
Appropriate Play and Work (PW)	.98	.74
Meaningful Communication (MC)	.99	.22
Echolalia (EC)	.76	.06
Self-Stimulation (SS)	.98	.26
Repetitive Object Play (RP)	.99+	.06
Sustained Noninteraction (NI)	.99	.55
PAR	.99	*
APP	.99	*
INA	.99	*
Guidance (G)	.97	.66
Social Attention or Guidance	.99	.87

*It is impossible to meaningfully assess interval-by-interval agreement on categories which are sums of other categories.

scores and the Pearson's r scores that the former is the more conservative measure of inter-rater reliability. Because the data requiring percentage agreement were to be used for exploratory analyses only, no specific criterion for acceptability was set. The categories of interest for the conditional probabilities are Social Interaction with Adults, Appropriate Play and Work, Meaningful Communication, Sustained Non-interaction, Guidance, and Social Attention-or-Guidance. Only for SAG and SIA is the percentage agreement reliability quite strong. For the other categories, the percentage agreement is questionable, particularly MC where the two raters averaged scores of .33 and .22 respectively for each session.

The percentage agreement scores, calculated from session scores as they were, give a low estimate of reliability. This is a result of the fact that they treat all sessions as equal despite the fact that some sessions have far fewer instances of a given behavior. Sessions with fewer occurrences tend to have lower reliability. Thus, treating all sessions as equal tends to yield lower reliability scores than an overall count of agreements and disagreements which treats all occurrences, rather than sessions, equally. For instance, the overall percentage agreement for MC is .61, considerably higher than the .33 and .22 obtained by averaging session data. This should be taken into consideration when assessing the reliability of these categories.

Interviews

The interview was conducted by the author and was audio-taped. It was semi-structured and elicited information around major problem areas. The mother was asked to avoid making reference to help that

her family had received from TEACCH. This was done to reduce bias on the rating of the interviews. The interview was presented to mothers as a way for TEACCH to learn how autistic children affect their families. During the interview they were asked to discuss in as much detail as possible the effect of their child's problems on the family. The interviewer probed for possible problem areas, particularly those listed as dimensions of problem severity in Appendix C. See Appendix B for a more detailed description of interview procedures.

Raters were chosen to rate the interview tapes on the basis that they had some experience with family adjustment issues. They were blind as to the stage of treatment or wait period that a family was in. They each rated each family once. Each rater assessed five first interviews, five second interviews, and five third interviews. The author rated all of the interviews solely to check reliability.

Raters rated the problems on the degree of severity of its effect on family functioning, using the rating system described in Appendix C. The rating yields a score of 0 to 4, ranging from no problems to severe disruption of family functioning on each dimension. The dimensions include ratings of Problem Severity, Mother's Emotional Upset, Discord in the Family System, Restriction of Social Involvement, Mother's Understanding of Child Problems, Parents' Management Skills, and Current Situation. Each of these areas were rated in reference to issues concerning the autistic child.

Interview rating reliability. The inter-rater reliability of the interview ratings was measured by Pearson Product-Moment Correlations of a given rater's scores with those of Rater #1, the author. These correlations are listed in Table 4.

TABLE 4

INTER-RATER RELIABILITY FOR INTERVIEW RATINGS

	RATER		
Aspect Rated	#2	#3	#4
Stress (Sum of 1-7)	.89*	.88	.79
1. Severity of Child Problem	.66	.53	.74
2. Mother's Upset	.92	.85	.76
3. Discord in Family System	.70	.82	.79
4. Restriction of Social Involvement	.78	.81	.95
5. Mother's Understanding of Child	.53	.44	.20
6. Parents' Management Skills	.75	.85	.52
7. Current Situation	.85	.85	.75

*Pearson's Product-Moment Correlations

The Stress rating is the only interview rating to be used in testing the main hypotheses. The criterion set for reliability was .80. Raters #2 and #3 were above this level while Rater #4 fell just below (r=.79). This was determined to be an acceptable level of inter-rater reliability. The level of reliability for each of the separate rating areas was surprisingly high. With the exception of Severity of Child Problem and Mother's Understanding of Child, the reliability scores over the three raters is quite good for each of the dimensions rated, being fairly consistently above .70, although it was often not over .80.

Questionnaires

The Questionnaire on Effects of Child Problems on Family elicited the mother's opinions on each of the seven issues rated by the interview raters (see Appendix F). This was administered after each interview.

The Questionnaire on Effects of Treatment sought parents' opinion of change due to treatment in the following areas: child's overall functioning; parents' understanding of child; family functioning; child's happiness; parents' comfort with child; child's communication; child's responsiveness to parents; child's amount of normal play; child's amount of unusual behavior; and parents' teaching skill (see Appendix D). This was administered on the third visit only.

Data Analyses

The testing of the four main hypotheses was carried out on variables derived from the behavioral observation data and ratings of the interviews with mother. The first three hypotheses were tested on

variables obtained by summing the totals for a given visit of three sets of behavior categories. The fourth hypothesis was tested on a variable which is the sum of the ratings of severity for a given interview. Thus, for testing the main hypotheses, one score on each of the four variables was determined for each family on each visit.

The first hypothesis suggested that parents would show an increase due to treatment in the degree to which they are actively involved with their child during the time they spend with him. The variable corresponding to this hypothesis is PAR. It is the sum of the totals per 1 1/2 hour observation period of the following behavior categories: Verbal Guidance (VG), Gestural Guidance (GG), Physical Guidance (PG), and Social Attention (SA). The hypothesis was that this variable would show a greater increase from the second evaluation (E_2) to the third evaluation (E_3) than it did from the first evaluation (E_1) to the second.

The second hypothesis was that the autistic children would show an increase due to treatment in the amount of time in which they are either engaged in appropriate play or work or interacting with other people. The following categories are summed to obtain a variable, APP, corresponding to this hypothesis: Social Approach (A), Social Interaction with Adults (SIA), Social Interaction with Children (SIC), Appropriate Play or Work (PW), and Meaningful Communication (MC). This variable was also hypothesized to show a greater increase from E_2 to E_3 than from E_1 to E_2.

The third hypothesis suggested that the autistic children would show a decrease due to treatment in the amount of time in which they either were engaged in inappropriate play with objects or self-

stimulatory behavior, or were not interacting at all with objects and people. The variable corresponding to this hypothesis is INA, the sum of Repetitive Object Play (RP), Self-stimulation (SS), and Sustained Non-interaction (NI). This variable was hypothesized to show a greater decrease from E_2 to E_3 than from E_1 to E_2.

The fourth hypothesis was that the family would show an increase due to treatment in their ability to handle the child's problems in the home without sacrificing other important aspects of family life. The variable corresponding to this hypothesis is called "Stress." It is the sum of the seven ratings of severity made on each interview (see Appendix C). Since high values of this total indicate severe problems, the hypothesis was that this variable would show a greater decrease from E_2 to E_3 than from E_1 to E_2.

III. RESULTS

Treatment Effects: Four Main Hypotheses

The question posed by the hypotheses is whether change with treatment is greater than change without treatment. In order to address this question, a new variable was created from each of the main outcome measures. The variable is a measure of the difference between the change scores during the waiting and treatment period. The new variable takes the form $(T_3-T_2) -(T_2-T_1)$, where "Tx" represents the value of the variable for session x. A multivariate analysis of variance for repeated measures was used to test the difference in change scores as represented in the new variable (McCall & Appelbaum, 1973).

The overall F for all four main measures was highly significant ($F = 43.96$; $p < .001$). Thus, the overall hypothesis that there is greater improvement with treatment than without is confirmed. Examining the univariate F tests for the individual measures reveals that the first and second hypotheses of the study were confirmed. That is, the increase in PAR, parental involvement, and in APP, appropriate child behavior, was significantly greater during the treatment period than during the waiting period ($p < .04$ and $p < .001$ respectively). The third and fourth hypotheses were not confirmed, although they showed trends in the hypothesized direction. The decreases in INA, inappropriate child behavior, and Stress were

not significantly greater at the level of $p < .05$ during the treatment period than during the waiting period. The p values for these variables were .10 and .08.

The means and standard deviations for the main outcome measures are listed in Table 5. The scores for each case on the main variables are listed in Tables 11-14 in Appendix J. It can be seen that each changes in the direction of improvement during the treatment period, Session 2 to Session 3. Treated independently, these changes on all four variables were significant using a multivariate analysis of variance for repeated measures ($p < .005$). The changes during the waiting period on all four measures are also in the direction of improvement. However, none of these changes are significant at the .05 level. The Stress measure shows a trend toward a significant decrease during the waiting period ($p < .11$).

The main data analyses, just described, do not take into account the fact that the treatment period was considerably longer than the waiting period. Since the change during the waiting period was in the direction of improvement for all four measures, it could be argued that the greater change during the treatment period was due to the greater amount of time elapsed.

This argument is illustrated in Figure 2, in which the scores on the main measures are plotted on the ordinate with time on the abscissa. The slope of the line represents the rate of change over time. On the Stress measure, the slopes of the lines representing change during treatment and change during the waiting period are similar. This is the case even though the absolute magnitude of the change is greater during the treatment period.

TABLE 5

MEAN SCORES ON MAIN OUTCOME MEASURES

		1st Visit	2nd Visit	3rd Visit
PAR[1]	$\bar{X}$	.69	.74	.98
	SD	.29	.28	.23
APP[2]	$\bar{X}$	.86	.89	1.32
	SD	.54	.52	.55
INA[3]	$\bar{X}$	.48	.47	.27
	SD	.36	.47	.28
Stress[3]	$\bar{X}$	14.7	13.3	9.7
	SD	6.3	5.1	4.5

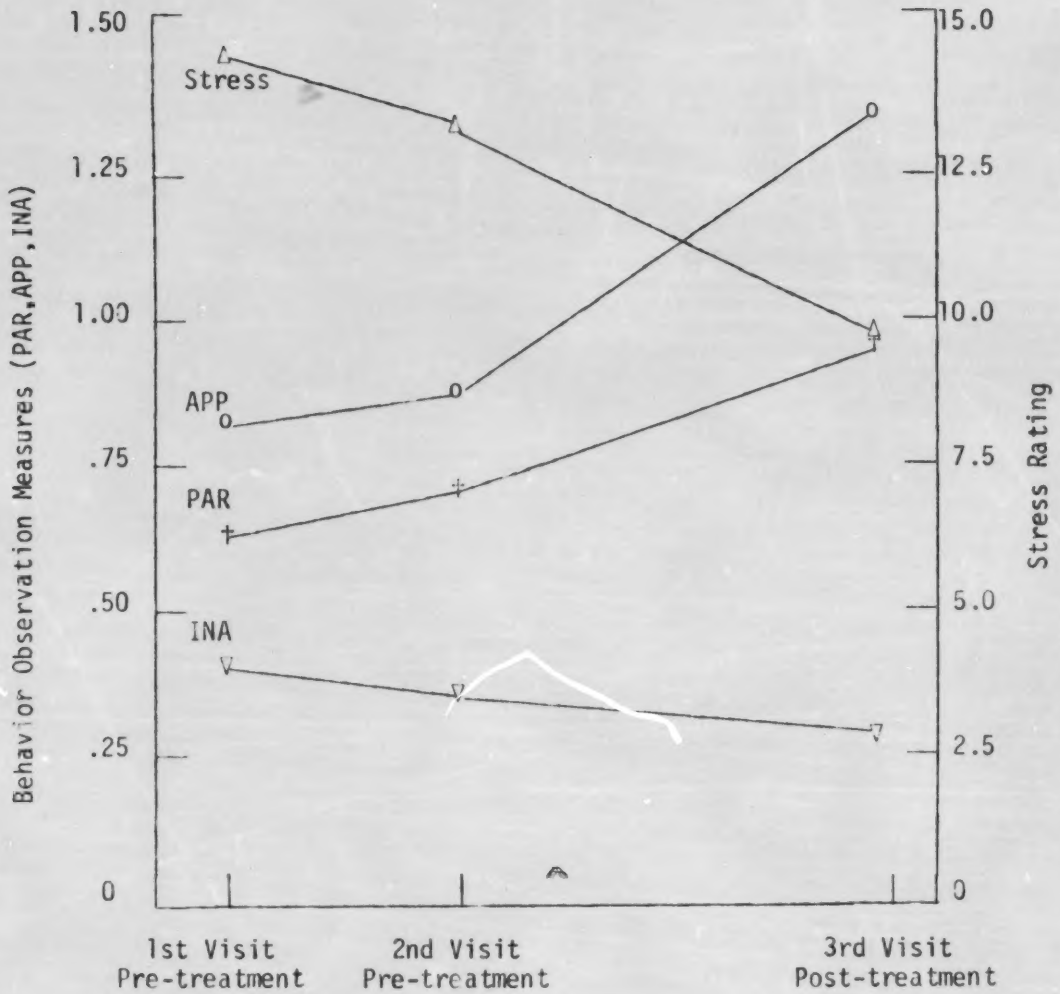
[1]Change with treatment significantly greater than change without treatment, $p<.04$.

[2]Change with treatment significantly greater than change without treatment, $p<.001$.

[3]Change shows a trend toward being significantly greater with treatment than without, $p<.10$.

FIGURE 2

MAIN OUTCOME MEASURES



The problem of the differences in time was dealt with in two ways. First, a statistical analysis was developed which adjusts the change scores according to time elapsed. This analysis, described below, offers a more conservative test of the main hypotheses. Second, the scores of the seven families with the shortest duration in treatment were compared to those of the seven families with the longest duration of treatment. No systematic differences were found as each group showed somewhat more improvement than the other on two of the four measures. This was interpreted as indicating that length of treatment time was not a significant factor in determining treatment effects. Therefore, the time-adjusted analysis was not used to test the main hypotheses.

Because it offers a more conservative view of the data, the time-adjusted analysis will be briefly discussed here. In order to take into account the differences between the waiting and treatment periods, the change scores for each child on each of the four main measures were divided by the number of days in the period over which the change occurred. This yielded values comparable to the slopes of the lines in Figure 2. The repeated measures analysis was then applied to the difference between the slopes during the treatment and waiting periods. Only the variable APP showed significant effects on this analysis ($p < .05$). PAR, INA, and Stress did not. However, a sum of the three parent behaviors most closely related to the first hypothesis did show significant change with treatment ($p < .05$). This sum comprised Verbal Guidance, Gestural Guidance, and Physical Guidance. Thus, the more conservative, time-adjusted analysis supports the hypotheses concerning parental involvement and appropriate child behavior, just

as did the analyses reported above. Similarly, the time-adjusted analysis fails to support the hypotheses concerning inappropriate child behavior and family adaptation.

Patterns of Change

Several analyses were carried out on the data to further clarify the nature of the changes in the variables. These should be viewed as suggestive rather than conclusive. Treatment effects reported below were tested during the same analysis that was used to test the main hypotheses.

Patterns of change in parent behavior. It is useful to analyze the components of parental involvement which contribute to the treatment effect shown on this variable. Verbal Guidance, Gestural Guidance, and Social Attention are represented in the graph in Figure 3 and Table 6. In the graph, it is apparent that the increase with treatment in parent involvement consists of the increase in the Guidance categories, particularly Verbal Guidance and Gestural Guidance ($p < .005$ and $p < .02$, respectively). Social Attention, because it is mutually exclusive with the Guidance categories, actually decreases with treatment after showing a non-significant increase during the waiting period.

Pattern of change in child behavior. The treatment effect on appropriate child behavior (APP) can also be analyzed into its components (see Figure 4 and Table 7). Appropriate Play or Work and Meaningful Communication appear to be the variables most directly linked to treatment. They both show significantly more improvement with treatment ($p < .01$). Social Interaction with Adults increases with treat-

FIGURE 3

PARENT BEHAVIOR OVER THREE VISITS

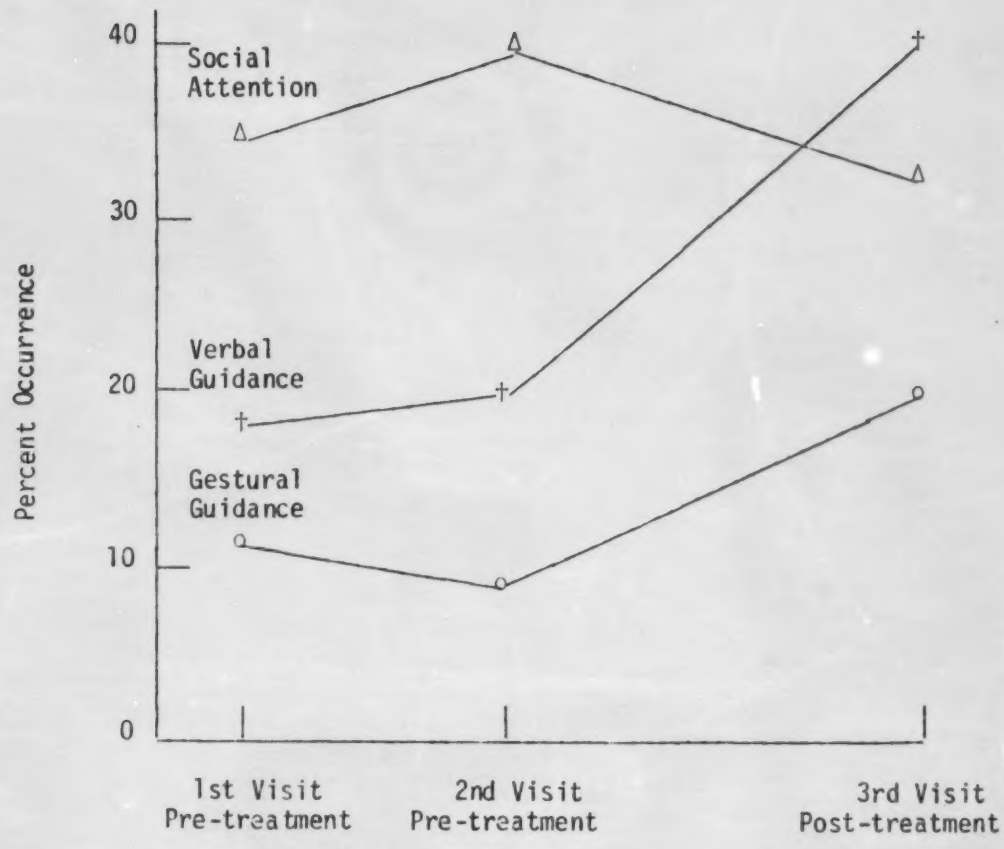


TABLE 6

MEAN SCORES ON PARENT BEHAVIOR CATEGORIES[1]

		1st Visit	2nd Visit	3rd Visit
Verbal Guidance (VG)[2]	$\bar{X}$	.19	.21	.40
	SD	.15	.15	.21
Gestural Guidance (GG)[3]	$\bar{X}$	.12	.11	.21
	SD	.15	.09	.12
Social Attention (SA)	$\bar{X}$	.36	.40	.31
	SD	.14	.24	.18

[1] Physical Guidance and Aversive Communication were excluded because of inadequate reliability.

[2] Change with treatment significantly greater than change without treatment, $p < .005$.

[3] Change with treatment significantly greater than change without treatment, $p < .02$.

FIGURE 4

CHILD BEHAVIOR OVER THREE VISITS

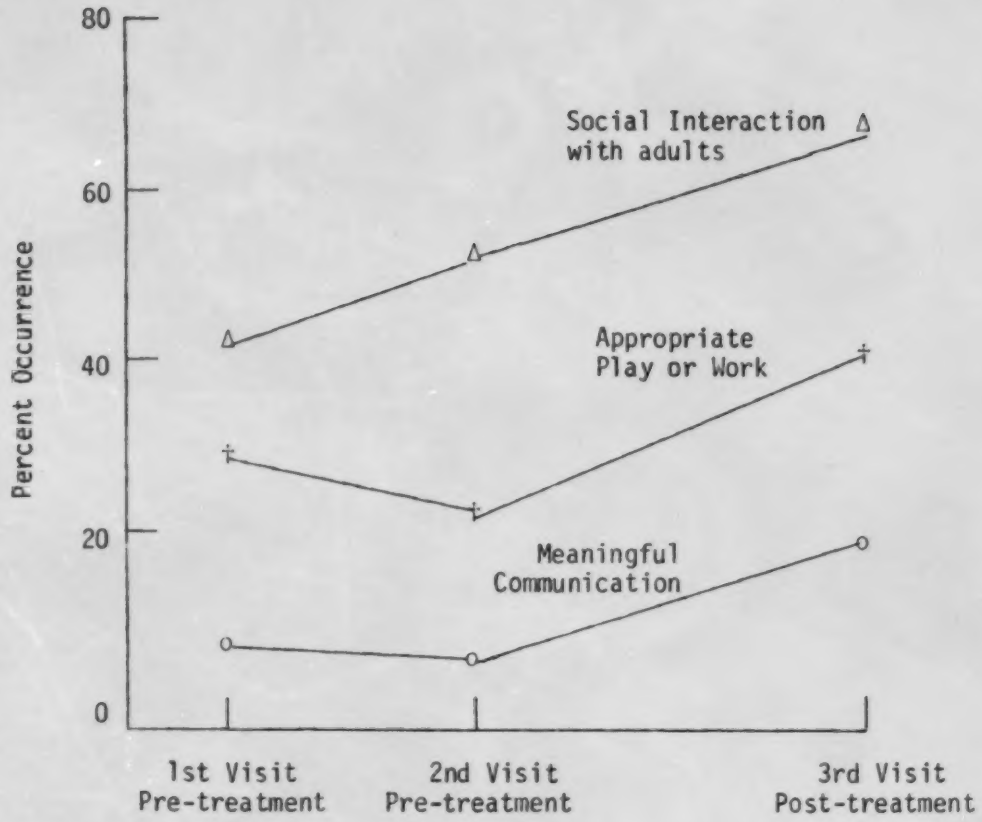


TABLE 7

MEAN SCORES ON APPROPRIATE CHILD BEHAVIORS[1]

		1st Visit	2nd Visit	3rd Visit
Social Interaction w/Adults (SIA)	$\bar{X}$	.41	.49	.67
	SD	.19	.21	.15
Social Interaction w/Children (SIC)	$\bar{X}$	.03	.03	.02
	SD	.03	.04	.03
Appropriate Play and Work (PW)[2]	$\bar{X}$	.29	.26	.41
	SD	.23	.22	.23
Meaningful Communication (MC)[2]	$\bar{X}$	.10	.10	.21
	SD	.21	.18	.26

[1]Approach was excluded because of inadequate reliability.

[2]Change with treatment significantly greater than change without treatment, $p < .01$.

ment, but also increases during the waiting period.

It was reported above that child inappropriate behavior (INA) did not decrease significantly more with treatment than without. None of the three components of this measure showed significantly more improvement with treatment than without, although Sustained Non-interaction shows a trend in this direction (see Table 15 in Appendix J). Self-stimulation showed almost no mean change. Repetitive Object Play showed change in the expected direction. However, the variance of the change scores was very large in relation to the mean difference in this change.

Aspects of change in family adaptation. As previously noted, there was not a significant treatment effect on Stress, the interview-based measure of the families' ability to cope with the stress of having an autistic child. It appeared that this failure to confirm Hypothesis 4 was partially due to a trend toward change before treatment began.

It is tempting to try to determine which areas on the rating scale accounted for the most change before, and during, treatment. Unfortunately, such an attempt would be likely to produce misleading information for two reasons. First, the different dimensions on which the interview was rated were not designed to be scaled comparably. Therefore, there is no guarantee that a greater magnitude of change on one dimension than on another indicates that treatment had more effect on the former area than the latter. Second, the inter-rater reliability of the dimensions is inconsistent. This compounds the problem just described because it suggests that some dimensions of the rating may be more sensitive to treatment changes than others.

As was the case with the Stress score, none of the separate dimensions which were summed to yield the Stress score showed a significant treatment effect when compared to the waiting period. The means for the individual dimensions are listed in Table 16 in Appendix J.

Some confirmation of the overall pattern of change on the Stress measure was given by the results of the Questionnaire on Negative Child Effects (see Figure 5). The pattern of change on the latter measure was very similar to the pattern of change on the former, as shown in Figure 3. The means of the overall rating on the questionnaire and the ratings for each separate question are listed in Table 8. As with the interview ratings, it is probably wise to refrain from speculating on differences among the questions in the amount of change shown. It is worth noting that all of the areas showed improvement with treatment, although only for Understanding of Child and Management Skills are the changes statistically significant ($p < .05$).

Parents' perception of outcome. Parents' perception of treatment outcome was assessed from their responses to the Questionnaire on the Effects of Treatment, summarized in Table 9. Data on responses to Question 9 were not included in the table because several parents appeared to be confused about its meaning. All but two of the mean ratings are in the slightly to markedly better range. Only one parent, a father, felt that his child had become worse (slightly) in an area as a result of the program. The area was normal play.

Changes in parent-child interaction. The behavioral observation data reported above reflect changes in amounts of specific parent and child behaviors. However, they shed no light on the nature of change

FIGURE 5

QUESTIONNAIRE ON NEGATIVE CHILD EFFECTS
OVER THREE VISITS

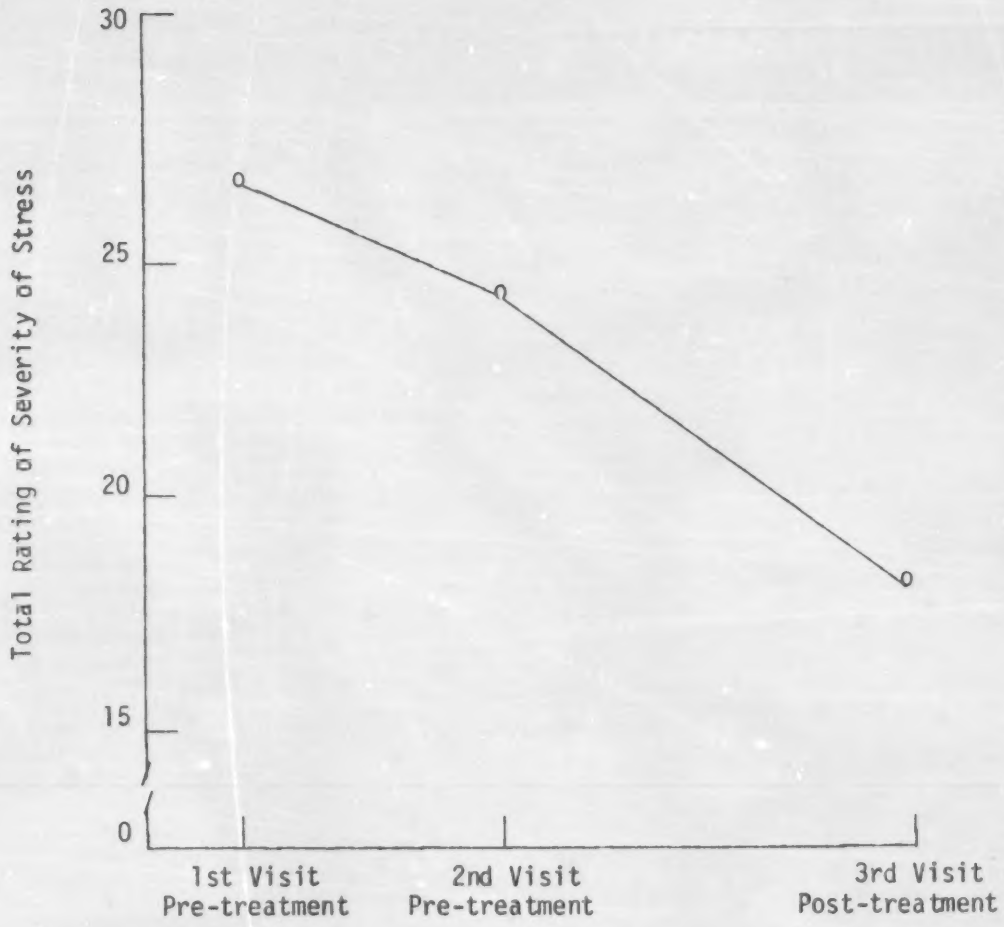


TABLE 8

MEAN SCORES ON QUESTIONNAIRE ON EFFECTS OF CHILD PROBLEMS ON FAMILY

		1st Visit	2nd Visit	3rd Visit
Overall Score (Sum of #1-#7)	$\bar{X}$	26.53	24.60	18.47
	SD	5.63	5.23	6.59
Severity of Child Problem	$\bar{X}$	4.33	3.93	2.80
	SD	1.54	1.22	1.26
Mother's Emotional Upset	$\bar{X}$	4.13	3.87	2.73
	SD	1.64	1.51	1.10
Discord in Family System	$\bar{X}$	3.40	3.40	2.80
	SD	1.68	1.24	1.42
Restriction of Social Involvement	$\bar{X}$	4.07	3.47	2.80
	SD	1.83	1.18	1.32
Mother's Understanding[1] of Child	$\bar{X}$	3.20	3.07	2.20
	SD	1.37	1.03	1.32
Mother's Management[1] Skills	$\bar{X}$	3.60	3.60	2.40
	SD	1.12	1.18	0.91
Current Situation	$\bar{X}$	3.80	3.27	2.73
	SD	1.32	1.22	1.22

[1] Change with treatment significantly greater than change without, $p < .05$.

TABLE 9

MEAN SCORES ON QUESTIONNAIRE ON THE EFFECTS OF TREATMENT[1]

Scale: 1-Markedly Worse 2-Slightly Worse 3-About the Same 4-Slightly Better 5-Markedly Better

	Mothers (N=15)		Fathers (N=9)	
	$\bar{X}$	SD	$\bar{X}$	SD
1.Child's Overall Functioning	4.73	.46	4.89	.33
2.Parent's Understanding of Child	4.60	.63	4.33	.71
3.Family Functioning	4.53	.52	3.89	.93
4.Child's Happiness	4.33	.72	4.44	.88
5.Parent's Comfort with Child	4.53	.74	4.22	.97
6.Child's Communication	4.53	.64	4.56	.73
7.Child's Responsiveness	4.60	.51	4.11	.78
8.Child's Normal Play	4.27	.59	3.89	.93
10.Parent's Skill as Teacher	4.47	.64	4.56	.73

[1]Question #9 was excluded due to the fact that parents were confused by it.

in parent-child interactions . Since parent-child interactions are a central focus of treatment, conditional probabilities were used to study changes in them.

A conditional probability is the likelihood that one behavior occurs given that another behavior occurs. For instance, in the study of parent-child interactions, it is of interest to know the probability that certain child behaviors occur given that a parent is directing behavior at the child. If the child behavior is called 'x' and the parental attention is called 'Y', then the probability that x occurs given that Y occurs can be represented by 'x/Y'.

The likelihood of occurrence of four child behaviors given the presence of some form of parental involvement was examined over the three visits. The child behaviors were Social Interaction with Adults, Appropriate Play or Work, Meaningful Communication, and Sustained Non-Interaction. Table 10 lists the means of the probabilities of occurrence of each of these behaviors given the presence of parental involvement. All of the conditional probabilities change in the direction of improvement with treatment. That is, the likelihood that a child will show appropriate behavior given parental involvement increases with treatment. Likewise, the likelihood that a child will show inappropriate behavior given parental involvement decreases with treatment. The change with treatment was significantly greater than the change without treatment for all four conditional probabilities ($p < .05$). It is also worth noting that Appropriate Play or Work given Guidance, a more structured form of parental involvement, also increases with treatment. This variable also shows a significant treatment effect ($p < .05$).

TABLE 10

MEAN SCORES ON SELECTED CONDITIONAL PROBABILITIES

		1st Visit	2nd Visit	3rd Visit
Social Interaction w/Adults[1]	$\bar{X}$	.71	.74	.87
Social Attention or Guidance	SD	.19	.14	.09
Appropriate Play or Work[1]	$\bar{X}$	.25	.23	.43
Social Attention or Guidance	SD	.21	.19	.21
Meaningful Communication[2]	$\bar{X}$	.14	.12	.24
Social Attention or Guidance	SD	.26	.19	.29
Sustained Non-interaction[1]	$\bar{X}$	.20	.20	.08
Social Attention or Guidance	SD	.18	.15	.08
Appropriate Play or Work[1]	$\bar{X}$	.45	.46	.62
any Guidance category	SD	.25	.18	.15

[1]Change with treatment significantly greater than change without treatment, $p<.05$.

[2]Change with treatment significantly greater than change without treatment, $p<.005$, but note that percent agreement reliability on Meaningful Communication is questionable.

The conditional probabilities also shed light on the changes in the children's independent play. Independent play was operationally defined as Appropriate Play or Work which occurs during intervals in which there is no parental involvement. There was little change over the course of the study in independent play, thus defined.

Data for the conditional probabilities were taken from the codings of Rater #1, the author. This was done because the author was the only rater who was present on all visits. It was felt that the chance that the conditional probability data could be biased was small. There were no prior hypotheses concerning them and they are obtained rather indirectly from the observation coding data. The questionable inter-rater reliability of some of the behavior categories dictates that caution be used in interpreting the conditional probability findings.

Relationships among change variables. In an attempt to find relationships among different areas of therapeutic change, relationships among the dependent variables were examined by correlating change in session scores for different variables. The change score which was used for correlations was the difference between the average of the scores on the given measure for the family's first two sessions and the score during the last visit. Pearson Product-Moment Correlations were computed for selected pairs of variables.

In general, there was a dearth of strong relationships among the variables. Twenty-five pairs of variables were selected as likely to show some relationship although many more were run on pairs of variables. Of the twenty-five, only three were significantly highly correlated ($p < .05$). Such a result indicates that correlations which do appear

to be statistically significant may, in fact, be due to chance.

Two variables in the behavior observation coding system, Guidance and Meaningful Communication, were correlated with a Pearson's r of .52 ($p < .05$). The other two significantly correlated pairs of variables involved variables from different measures. Mother's Emotional Upset, as rated from interview tapes, was inversely correlated with the mothers' rating of their comfort with their child ($r = -.65$; $p < .01$). Finally, the interview ratings of the child's problem behavior was correlated with the mother's rating of the same issue on the Questionnaire on Child Effects ($r = .60$; $p < .02$). Other correlations between interview ratings of a given issue with Questionnaire ratings on the same issue were not significant, although two showed trends in the direction of a significant relationship. The overall scores on the two measures also showed a trend towards significant correlation ($r = .47$; $p < .08$).

Also of interest are correlations between Guidance and Mother's Emotional Upset as rated from the interview ($r = .62$; $p < .02$), and between Appropriate Child Behavior and Mother's Emotional Upset as it was self-reported on the Questionnaire ($r = -.70$; $p < .005$).

Relationship between demographic variables and outcome. The relationship between demographic variables and outcome was examined by plotting the change scores on the main measures against the demographic variables, looking at rank order relationships between the two types of variables, and examining means on change scores for groups classified by demographic characteristics. Age, social class, and IQ were correlated with the changes scores on the main outcome variables. No notable relationships were found.

IV. DISCUSSION

Effectiveness of Treatment

The overall results for the four main hypotheses indicate that the use of parents as co-therapists in the psychoeducational treatment of their own autistic children is effective. This result affirms the clinical impressions of those who have used the treatment and supports the results of other studies of treatment efficacy (Marcus et al., 1978; Schopler et al., in press). Because of the complexity of factors which may contribute to the success of the treatment, it is not possible to conclusively generalize this finding to treatments applied in settings other than the one studied here, North Carolina's statewide program, Division TEACCH. However, the results are encouraging in demonstrating the feasibility of effective parent-oriented programs.

The first two hypotheses were confirmed by the results. (1) Parents became more actively involved with their children as a result of treatment. (2) The autistic children showed more appropriate behavior as a result of treatment. These treatment effects reflect success in attaining central goals of the treatment program.

The last two hypotheses were not confirmed. However, the variables used to test them showed significant improvement during the treatment period. (3) Both inappropriate behavior by the child and (4) the family's ability to cope with the autistic child improved over the treatment period, and showed trends towards significant treatment

effects. Although the change cannot definitely be linked to the treatment, the results are equivocal and do not rule out the possibility that treatment had effects in these areas.

The design of the study called for a comparison of change during treatment with change during a waiting period. This is a more conservative approach than is used in many studies of parent training programs, which often assess treatment effects by assessing the significance of change during treatment from a baseline score (Patterson and Fleischman, 1979; Hemsley et al., 1978). Such studies do not directly compare changes during treatment with changes that occur without treatment. In the present study, such an analysis would yield significant change on all four main outcome variables. However, the comparison of change with and without treatment, a more rigorous approach to evaluating treatment effects, yields the more modest results outlined above. This analysis makes it possible to state with more certainty that the effects are due to treatment.

Patterns of Change

The nature of the change in the various measures can be analyzed beyond the testing of the main hypotheses. However, because they were not main hypotheses, the following findings and discussion should be viewed as exploratory.

Change in observed behavior. The treatment procedure might be expected to have a more discernable effect on behaviors which involve a more skilled response from both parents and children. This was indeed the case. Among parent behaviors, Verbal Guidance and

Gestural Guidance showed the most improvement with treatment while showing no change without treatment. Among child behaviors, this is true of Appropriate Play or Work and Meaningful Communication. The guidance categories involve active intervention by the parents into the behavior of the child. Appropriate Play and Meaningful Communication require some knowledge and a skilled response from the child. Thus, treatment appears to have its clearest effect on the most sought-after behavior in both parents and children.

Behaviors which were not linked to treatment were Social Attention by adults and Social Interaction with Adults by children. Both of these categories reflect interactive behavior. Both showed a trend toward increase during the waiting period. Social Attention actually decreased with treatment. This was probably because it is mutually exclusive with the Guidance categories, which increased dramatically during the treatment period. Parents appear to have shifted to more active guidance in their interactions with their autistic child as a result of treatment. Social Interaction with Adults by the children continued to increase with treatment.

The data from the conditional probabilities suggest that the nature of the parent-child interaction changed through treatment. The behavior codings were of occurrences in intervals, rather than sequences of behaviors. Thus, the conditional probabilities do not directly reflect interactions. However, since the intervals are short (10 seconds), it is reasonable to hypothesize that the changes in conditional probabilities reflect changes in interaction.

Treatment increased the likelihood that parental behavior directed at the child would be accompanied by appropriate behavior by the child.

This was true for the three major child behavior categories, Social Interaction with Adults, Appropriate Play and Work, and Meaningful Communication. This pattern also holds when one looks only at parental guidance behaviors, although this was tested only for Appropriate Play. These findings suggest that parents are more effective in eliciting appropriate behavior as a result of treatment, and that the autistic children become more appropriately responsive to their parents as a result of treatment.

Data from the conditional probabilities also illustrates some limitations in the progress made by the children in the study. It appears that most of the increase in Appropriate Play is accompanied by parental guidance. There was little or no increase in the amount of play occurring independently from parental intervention. This may be due in part to the parents' greater sensitivity to, and involvement in, the child's appropriate behavior. Parents may be responding more with reinforcement to positive behavior that their child shows. Probably more important in explaining these data is that much of the increased appropriate child behavior is structured by the parents.

Autistic children have a notoriously difficult time functioning well outside of a structured situation. Helping them to generalize behavior from a teaching situation to independent use has been a problem for most workers in the field (Lovaas et al., 1973; Churchill, 1978; Rutter and Bartak, 1973). In Lovaas et al.'s (1973) study, most of the behavioral change appears to have occurred in a situation calling for responses to another person, as opposed to an independent play situation. The results of the present study seem to reflect the same process. The children have become more responsive to adult

intervention and have probably gained skills which they did not previously have. However, they are still very limited in their ability to use these skills independently.

It is possible that the period of treatment under study was not long enough to allow for the development of independent play. Continued treatment and work by parents might produce an increase in independent play. Such a finding is beyond the scope of the present study.

It would be possible, in examining the conditional probability data, to surmise that the changes that occur are due to changes in only one member of system (parent or child). For instance, one could view the child as the one who has changed. From this assumption, one might argue that changes in the parents' behavior are simply a response to the changes in the child. Parents are likely to do more active teaching with a child who is more responsive. The behavioral observation data do not permit an analysis of this issue. In fact, it is doubtful that responsibility for change in an interaction can sensibly be attributed to any single member of the interaction. The parent-child interaction is one of mutual influence with the actions of one constantly influencing the other. The goal of treatment might best be viewed as changing the system of the child in the family, since the latter is the environment in which the child must adapt.

Among negative child behaviors, Self-stimulation and Repetitive Object Play, which is a form of self-stimulation, do not show significant change with treatment, although the latter did decrease during the treatment period. There are three possible explanations for the lack of strong treatment effects on these behaviors. It is difficult to conclude from the data whether or not decreasing self-stimulatory

behavior is a relative weakness of the treatment program.

First, Self-stimulation and Repetitive Object Play had a low frequency of occurrence in the population studied. A few of the children showed high rates of these behaviors while others showed little or none. This contrasts with the high frequency of this behavior in other autistic populations (e.g., Lovaas et al., 1973). Because it is a low frequency behavior, a significant decrease in its occurrence is less likely.

Second, self-stimulatory behavior is generally not targeted for intervention by TEACCH therapists. This may be related to the fact that these behaviors are not generally of high frequency in the TEACCH treatment population. Except in cases where it clearly interferes with the teaching of the child, or his personal safety, therapists generally deal with it by teaching alternative appropriate behaviors. This strategy is viewed as having a more enduring effect in decreasing these behaviors. This may be related to the lack of more dramatic short-term change in self-stimulatory behaviors.

Finally, self-stimulatory behaviors are known to be highly variable (Nordquist & Wahler, 1973). The variance of the difference between the change during treatment and the change during the waiting period was greater for Repetitive Object Play than for any other variable. This also makes significant results less likely.

Change in family adaptation. There was change in the direction of improvement on all four main outcome measures during the waiting period. Only for the interview ratings of the families' ability to cope with their child did this change approach significance. This pre-treatment trend partially accounts for the fact that this measure showed only a

trend towards a treatment effect. The pattern of change in the family's adaptation is supported by the results of the Questionnaire on the Effects of the Child on the Family, which elicited the mother's opinions on the same issues rated from the interview. Like the interview ratings, this measure showed some improvement during the waiting period and more improvement during treatment.

The trend toward improved adaptation during the waiting period may be due to expectancy. Parents may feel less stress as a result of knowing that they will soon be receiving help with their problems (Murray & Jacobson, 1971). Interestingly, the pre-treatment effect is most pronounced on the adaptation measure as opposed to the behavior coding measures. It is not surprising that expectancy has a greater effect on the more global issues subsumed under "adaptation" than on specific interactive behaviors.

Although treatment cannot be conclusively linked to improvement in the family's adaptation to the problems of having an autistic child, it is not unlikely that treatment did have such an effect. When analyzed independently, changes during treatment on both family adaptation measures, the interview rating and the questionnaire, were highly significantly different than zero. Murray and Jacobson (1971) point out that expectancy effects are not likely to have a strong effect over an extended period of time. They are less likely to account for the change during the treatment period than the change during the waiting period. This hypothesis is supported by the fact that the absolute amount of change during the treatment period was more than twice as large as that during the waiting period. Thus, non-specific factors influencing change during the waiting period may be disguising genuine

treatment effects. The data are equivocal for resolving this issue. Treatment effects on family adaptation should be the focus of further research.

The change in individual areas of family functioning, as rated by mothers and blind raters, are not highly correlated. Only the change in the ratings of the Severity of Child Problems are significantly correlated. The overall change scores on the two measures show a trend toward significant correlation, as do two other individual areas. It is not possible to determine whether or not these trends would become significant if more subjects were involved. The data do not strongly suggest that the individual rating areas on the interview rating scale and the Questionnaire for mothers are comparable.

I noted in the Results section that it was not possible to meaningfully compare change among the individual areas of family functioning rated by the blind raters. This makes it impossible to use them to analyze the nature and sources of the changes that occurred during the study on the family functioning measures. No such attempt will be made here.

Parent's view of treatment effects. The opinions of the clients are a crucial part of any evaluation of a psychological treatment. It is not possible to obtain opinions from autistic children, but it is possible to get their parents' views of the effectiveness of treatment. Their opinion of treatment is as important as any indicator of treatment success because they have the most direct contact with the phenomenon that treatment is designed to change, their lives and the lives of their children. Furthermore, changes in the parents' attitudes

and feelings are, in themselves, important goals of treatment.

Unfortunately, the views of parents are subject to many distorting influences, especially as they are elicited for a treatment study. In the present study, a single ten-question questionnaire elicited parents' opinions on the effects of treatment. This sort of questionnaire is subject to biased responses. Parents tend to evaluate treatment positively for various reasons which are independent of whether or not it led to improvement. However, it does not appear to be possible to directly elicit views on treatment in an unbiased manner. Despite these problems, it is important for a treatment to be positively evaluated by parents. The results of the present study indicate that the treatment was highly regarded by parents. Both mothers and father attributed change in themselves and their children to treatment. Taken with the other data in the study, this is an important and encouraging finding.

Relationships Among Variables

Probably the most important finding from the correlations among selected variables is the lack of many significant correlations. A few correlations appeared to be significant and are discussed above. These include relationships among variables within the observation coding system, a relationship between coded Guidance behaviors and Mothers' Emotional Upset as rated from interviews, and some relationships between the interview ratings and the Questionnaire on Child Effects. However, significant correlations were so few that the significance of those with $p < .05$ must be viewed as questionable.

The finding is similar to that obtained by Forehand, Griest, and

Wells (1979), who studied relationships among outcome measures for families with aggressive children. These authors suggest that this lack of apparent relationships among measures demonstrates the need for using multiple outcome measures in treatment studies. Their's is a reasonable point.

However, one must also consider the psychometric properties of the measures in relation to the task of correlating scores on them. In the present study, the validity of the measures on a case by case basis has not been assessed. An assumption of the study is that changes in the measures across the entire group reflect real treatment change. To correlate these measures on a case by case basis may be assuming that the measures are more accurate and reliable for individual cases than they really are. Further complicating this problem is the fact that change scores derived from the measures, rather than the obtained scores themselves, are used in the correlations. The reliability of change scores may be low even when the reliability of the scores on which they are based is high (Cronbach & Furby, 1970). It would be wise to refrain from drawing conclusions from the failure to find correlations when the psychometric basis of these correlations is uncertain.

Strengths and Weaknesses of the Treatment

Having examined the patterns of change on the outcome measures, I will now discuss the strengths and weaknesses of the parents-as-cotherapists model as it is practiced at Division TEACCH. Some of the discussion will be based on my own observations and opinions as a clinician. The use of clinical observations is made necessary by the

fact, discussed earlier, that it is not possible to meaningfully compare differences in the amount of change in different outcome areas from the data.

Areas of most change. The strongest main finding of the study is the increase in appropriate behavior by the autistic children as a result of treatment. Without exception, the children showed increases with treatment over the average of their first two session scores on this variable. The change with treatment is significant even with the most conservative analysis. This change was also apparent for most children in clinical observation in the homes. Children generally showed a wider range of activities, mostly with materials, which they engaged in. They tended to show less perseverative play.

The children also tended to be more aware of, and responsive to, other people. A few children learned to use words, and one learned to use signs, during the course of the study. Those who had some language skills to begin with had expanded vocabularies after treatment, and more strikingly, made more use of their skills for communication. Many of the children showed obvious pleasure and excitement at their new-found competence. It appeared that their increased responsiveness was derived partly from their sense of mastery with objects and in interaction with people.

The changes in the children were clearest in highly structured situations, usually in interaction with a parent. This is not surprising. First, communicative and interactive behaviors require the presence of another person. Second, studies have shown that autistic children generally function better in highly structured situations (Schopler, Brehm, Kinsbourne & Reichler, 1971; Ney et al., 1971; Rutter & Bartak, 1973). The Schopler-Reichler model emphasizes parents structuring

interactions with children. The success of this approach in promoting appropriate behavior is evident. Some of the children, even those with little communicative ability, began to seek out the structured work situation, presumably because of its predictability and opportunities for successful task performance.

The treatment program was also very successful at increasing parental effectiveness in handling their children. Again, this was most evident in highly structured teaching situations. The data support the clinical observation that parents increased their guidance of their children and became relatively more effective in promoting appropriate behavior relative to the time they spent doing this. Parents learned to gear expectations to a child's skill level. They also learned to communicate at the child's level of understanding. For many children, this meant using more gestures and less or shorter verbal messages.

From clinical observation, it appeared that many parents also developed more skill in managing their children's difficult behavior outside of structured teaching situations. This seemed most true of highly noxious behaviors which became a specific focus of concern. Parents learned to use time-out, reinforcement of alternative behavior and other techniques to handle such problems as tantrums, destructive use of objects, and problems in getting a child to sleep.

A clinically obvious change in parents was the development of a sense of pride in their competence in handling their own children. Most parents seemed to enjoy teaching their children after treatment, where they had been tentative and self-deprecating in such efforts before treatment. The most extreme example of this was a mother who

was so depressed at her inability to handle her daughter on our second pre-treatment visit that she was considering giving up her two children to her relatives. On the third visit, she enthusiastically showed us what her daughter was learning to do and had found more time to devote to her normal son as well. This was probably the case showing the most change in parent and child. However, several other cases showed qualitatively similar changes, though the gains were not as quantitatively great.

The importance of these changes in parents cannot be overemphasized. First, the benefits to parents themselves are great. Second, the changes in the children which result from their parent's skills are significant. Third, parents come to have a practical understanding of their children's problems that is as great as that of most professionals. This is likely to make them better advocates for their children, most of whom will need their parents to coordinate their living, schooling, and working situations for much of their lives. In fact, TEACCH encourages parents to participate in advocacy groups for their children's welfare. Although this was not examined in the present study, it seems likely that parents who are skilled therapists for their children are more likely to take on activist roles in other situations as well.

Area of least change. The area where least change was evident in the results of the study was the amount of independent play by the autistic children. Clinical observations support the case made with the conditional probabilities that there was little progress in the amount of independent play by the children. Some learned to work at a task for a longer period of time than prior to treatment. However, parents generally initiated even this sort of activity. This finding

is disappointing but not surprising given what is known about autistic children, as noted earlier. It represents an area that calls for continued research and clinical experimentation.

Independent play has been made the focus of therapeutic work with some children at TEACCH, but this is not consistently done. An independent play activity can be made a part of a home program. Usually, such an activity will start with a simple activity at which a child is competent. The time of involvement with such an activity is short to begin with and is gradually increased. The child's developmental and work skills need to be considered in determining when and how to start such work, since some children have a great deal of difficulty working even with guidance. Independent play activities should probably be considered for all autistic children.

Limitations on the nature of change in the children. Despite the changes in the autistic children which resulted from treatment, all of the children continued to have serious handicaps. None developed age appropriate language skills and many still showed much abnormal behavior. This was expected. No program has offered convincing evidence that it cures autistic children. The TEACCH program does not make such a claim.

While children acquired new skills and became more responsive during the course of the study, there is no evidence that the children's developmental level was increased by treatment. As mentioned in the literature review, no studies have demonstrated a treatment effect on such measures as intelligence tests and developmental language tests. The study by Hemsley et al. (1973) focussing as it did on children with IQs over 60, was striking in its failure to show such an effect.

Scores on such tests will be examined when the present sample has been through a one-year re-evaluation. However, clinical observation suggests that treatment would not have a great impact on this sort of measure, with the possible exception of two or three relatively high functioning children.

It may be that treatment can have an effect on this sort of measure over a longer period of time than that covered by the present study. It is equally possible that IQ is simply a strong prognostic indicator which cannot be greatly altered in autistic children by treatment. The present study is not conclusive on the issue of the effects of treatment on developmental level.

Involvement of family members other than mother. In considering the effect of the treatment on the family as a whole, one might ask about the involvement in treatment of family members other than the mother. Family therapy theory suggests that focussing solely on the dyad of the mother and autistic child could have maladaptive effects on family structure (e.g., Minuchin, 1974). Although data on this issue is lacking (see Martin, 1977), it seems reasonable to suppose that involvement of other family members should help generalize effects of parent training to the home and provide a more supportive environment for mothers, who tend to take primary responsibility for the autistic children.

The therapists in the present study were highly successful in involving fathers in treatment, despite the fact that all treatment took place during working hours. As is noted in the Method section, eight of eleven fathers living in the homes of the autistic children regularly attended treatment sessions. In some cases, fathers appeared

involved equally with mothers in the treatment process while in others their role was secondary. The treatment questionnaire data shows that fathers were generally positive about the program. The work with the child usually seemed to be a family endeavor as opposed to the mother's domain. In at least one case, this represented a change from the family pattern prior to treatment.

The involvement of siblings was less consistent. Many attended school while the sessions took place. Others were too young to participate in their sibling's treatment. Some normal siblings did participate in treatment. They were taught to play games or to work with their autistic siblings. Some attention was given to the normal siblings' special concerns although this is not done consistently. Siblings who did become involved in treatment appeared to enjoy it.

From a family system's perspective, it would appear that more attention should be devoted to the issues of siblings of autistic children. Impediments to their inclusion in treatment are real. However, like their parents, they face unusual stresses in family interaction as a result of the autistic child's special problems.

Cost-effectiveness of treatment. One of the issues a treatment for any disorder must address is its cost-effectiveness. For instance, residential treatments for autism tend to involve large amounts of staff time and other expenses. Research projects which study treatments for autism rarely, if ever, report the amount of staff time required to produce changes in the children. In his work with families of aggressive children, Patterson has pointed out the need for data on cost-effectiveness (Patterson & Reid, 1973).

Division TEACCH is a statewide clinical service program, which has

served over six hundred families since it was started in 1971. The treatment studied here was the regular clinic treatment program. Cases which were part of the research were handled in essentially the same way as other clinic cases. No changes were made in treatment strategies for the research cases, although the therapists did know that the cases were involved in the outcome study. The families went through a typical series of 6 to 8 treatment sessions following a diagnostic evaluation. It is safe to say, given the results, that the treatment is a highly efficient use of staff time.

Drop-outs from treatment. As was noted in the Method section, six of nine families who dropped out of the research or treatment did so for practical reasons, mostly problems with transportation. Three families dropped out due to disinterest or dissatisfaction with the program. One of these withdrew prior to any contact with the clinic. This family was suspicious of experts such as doctors and reported negative experiences with a developmental evaluation clinic which had referred them to TEACCH. They also doubted that their daughter had the serious problems which they had been told she did.

Two other families withdrew from treatment after some contact with the clinic. These families simply stopped coming to treatment sessions and were difficult to contact. Neither gave a reason for stopping treatment. In both of these families, there was also a lack of appreciation of the seriousness of the child's problems. In both cases, the therapists sensed the lack of engagement of the families in treatment, but were unable to alter this pattern. All three of the families that withdrew from treatment were of low socio-economic status and Black. It seemed that cultural differences between the service providers and the families

may have contributed to the families' withdrawal from treatment. These families may have been somewhat intimidated by the clinic setting in a large hospital and the clinic staff, although the staff did not appear to treat these families differently from others of similar and different backgrounds.

Families which did best and worst in treatment. No strong relationships were found between change scores and age, social class, or IQ. This finding does not rule out such relationships, however. There are two reasons why such relationships might not be revealed if they did exist. The first is the low number of subjects in the study, which dictates against finding correlations. The second is the fact that change scores on the measures may not be appropriate for comparing families. It was noted earlier that change scores tend to have low reliability. Clinical impressions of which families gained the most from treatment did not always coincide with those that had the best change scores. This was largely because the group was so heterogeneous that change for one child could be qualitatively different than change for another.

It is worthwhile to consider features of the families which appeared clinically to make the most and least use of treatment. Families which appeared to benefit most from treatment were those which appeared most highly motivated to get help and change. For some families this motivation stemmed from the stress they felt due to their child's behavior. Others seemed to have the child's behavior under control but wanted ways to enhance his development. Most typically, there was a mixture of these two factors, although change was most obvious in families which appeared to be in stress initially.

Lovaas et al. (1973) suggest that parents who tend to be gentle and permissive tend to do poorly as behavior modifiers with their children. This did not appear to be a problem in training parents in the present study. This may be due to differences in the nature of the children's problems between our group and theirs. It also may reflect a difference in techniques. However, none of the parents in the present group did poorly in treatment because they were unable to see the need for using strong consequences. Parents who tended to be permissive with normal siblings would adjust their style when shown the advantages of a more structured intrusive approach with their autistic children.

The most prominent factor in families that did poorly in treatment was psychopathology that appeared to be independent of the child's psychosis. One mother had been diagnosed schizophrenic. Another appeared to have a paranoid personality, while the grandmother in the same family was periodically hospitalized with psychotic breaks. A third mother appeared to be quite immature and was in the midst of separating from her husband during treatment. Each of these parents seemed to have low interest in treatment from the start. Two appeared to have given up hope of seeing change in their child, while the third did not view her child as having significant problems. One of the former pair had placed her child in a residential school program during the school week, keeping the child at home over the weekend. The therapists themselves felt that they were not successful with these three cases in significantly changing the parents' view of their children.

Strengths and Weaknesses of the Present Study: A Summary

Strengths. Because of its methodological strengths, the present study offers an impressive demonstration of treatment effects produced by the Schopler-Reichler treatment model. Change during treatment was compared with change during a no-treatment control period. As was noted in the literature review, few other studies in the autism literature include such a feature. Among those that do, none show that the treatment is feasible for widespread implementation and cost-effective. The fact that the treated families in the present study were consecutive referrals to an ongoing clinical service program makes the study strong on this issue.

The measures are another strong feature of the study. Multiple outcome measures were used to assess changes in three crucial areas of concern: (1) parental guidance behavior; (2) child behavior; (3) family adaptation to the problems presented by the autistic child. Only the Hemsley et al. (1978) study has a comparable breadth of focus.

The measures in the study reported here are reliable and include features to reduce bias. Reliability was assessed on all of the interview rating data and most of the behavioral observation data that were used in the study. The interview ratings, which are susceptible to bias, were made by raters blind to treatment condition. This greatly reduced the likelihood that the ratings would be biased. A relative weakness in the study was the involvement of the author in the data collection procedures. This introduces a possible source of bias, but was unavoidable for practical reasons. Nevertheless, the instruments provide a sound basis on which to assess treatment.

Weaknesses. The optimal design for a group study would include a control group independent of the treatment group. The study reported here did not include this feature. There were two reasons for this. First, because the population studied is extremely heterogeneous, it would be difficult to assure the comparability on relevant variables of two independent groups. Second, the TEACCH program has a policy against witholding treatment for research purposes. Such a witholding of treatment is viewed as unethical.

Two problems arise in the interpretation of the data as a result of the design that was employed. First, the no-treatment waiting period was much shorter than the treatment period. This raises the question of whether or not the two periods are comparable. This issue is dealt with in the Results section.

The second design problem is that the sequential relation of the control and treatment period leads to equivocal results when there is improvement during the waiting/control period. This occurred on the variable Stress. Theoretically, a change in a control group could negate effects in a treatment group even if independent groups are used. However, when evaluation points are parallel to each other as they should be for independent groups, one can be more certain that factors influencing both groups are similar with the exception of the independent variable. In the sequential design used here, it is less clear whether or not expectancy effects have a similar impact on both groups. The particulars of this issue are discussed in more detail in the section on change in the family adaptation measures.

Recommendations for Future Treatment Research

The need for scientific research on treatments for autism is great. As is clear in the literature review, there are few studies which have investigated treatment effects with groups of autistic children. Even fewer have employed adequate control groups. The trends toward change without treatment that occurred in some of the measures in the present study demonstrate the need for control groups.

Another important feature of design which many studies lack is the use of multiple outcome measures. Especially because different measures of change tend not to be correlated, a thorough examination of therapeutic change requires multiple criteria. Parental management and teaching skill, child behavior, and family functioning issues should all be included in such an evaluation.

The issue of family adaptation to having an autistic child has received increasing attention recently. However, its inclusion in outcome studies has been rare. The psychometric properties of the measures used in the present study do not permit an analysis of different factors which are part of this issue. Work needs to be done to develop measures which would permit a finer analysis of these issues. Examples of questions which should be addressed include: What is the relation of change in parents' management skills to change in their emotional well-being? How does change in the autistic child's behavior affect siblings?

An area that showed little change during treatment in the present study was independent play. Future studies should examine the effect of treatment on this area of child behavior. It is one with which little success has been reported in the autism literature.

Follow-up studies are rare among studies of treatment effects with autism. The present study should be followed up, as should other autism treatment studies.

Finally, research needs to be conducted on the specific aspects of treatment which contribute to therapeutic change. The present study focussed on outcome and does not offer data on this issue. The description of treatment offered in the first chapter shows that many factors are involved in treatment. Determining which of these are necessary to treatment success should be subjected to empirical investigations. Studies by Schopler et al. (in press) and Koegel, Glahn and Nieminen (1978) address such treatment process issues directly. More investigations of this sort need to be done to link specific techniques and aspects of treatment with change in autistic children and their families.

REFERENCES

Bender, L. One hundred cases of childhood schizophrenia treated with electric shock. Transactions of the American Neurological Association, 1947, 72, 165-169.

Bender, L. A twenty-five year view of therapeutic results. In P.H. Hoch & J. Zubin (Eds.), The evaluation of psychiatric treatment. New York: Grune & Stratton, 1964.

Bergin, A.E., & Garfield, S.L. Handbook of psychotherapy and behavior change. New York: Wiley, 1971.

Berlin, I.N. Psychotherapeutic work with parents of psychotic children. In M. Rutter & E. Schopler (Eds.), Autism: A reappraisal of concepts and treatment. New York: Plenum, 1978.

Bettelheim, B. The empty fortress: Infantile autism and the birth of the self. London: Collier-Macmillan, 1967.

Birnbrauer, J.S., Peterson, L.R., & Solnick, J.V. Design and interpretation of studies of single subjects. American Journal of Mental Deficiency, 1974, 79, 191-203.

Brown, J.L. Prognosis from presenting symptoms of pre-school children with atypical development. American Journal of Orthopsychiatry, 1960, 30, 382-390.

Browning, R.M. Treatment effects of a total behavior modification program with five autistic children. Behavior Research and Therapy, 1971, 9, 319-328.

Campbell, D.T., & Stanley, J.C. Experimental and quasi-experimental designs for research. Chicago: Rand-McNally, 1963.

Campbell, M. Pharmacotherapy. In M. Rutter & E. Schopler (Eds.), Autism: A reappraisal of concepts and treatment. New York: Plenum, 1978.

Churchill, D.W. Language: The problem beyond conditioning. In M. Rutter and E. Schopler (Eds.), Autism: A reappraisal of concepts and treatment. New York: Plenum, 1978.

Creak, M. Schizophrenic syndrome in childhood: Further progress report of a working party. Developmental Medicine and Child Neurology, 1964, 6, 530-535.

Cronbach, L.J. & Furby, L. How should we measure change - or should we? Psychological Bulletin, 1970, 74, 68-80.

Davids, A., Ryan, R., & Salvator, P.D. Effectiveness of residential treatment for psychotic and other disturbed children. American Journal of Orthopsychiatry, 1968, 38, 469-475.

DeMyer, M.K., Barton, S., Alpern, G.D., Kimberlin, C., Allen, J., Yang, E., & Steele, R. The measured intelligence of autistic children. Journal of Autism and Childhood Schizophrenia, 1974, 4, 42-60.

DeMyer, M.K., Barton, S., DeMyer, W.E., Norton, J.A., Allen, J., & Steele, T. Prognosis in autism: A follow-up study. Journal of Autism and Childhood Schizophrenia, 1973, 3, 199-246.

DeMyer, M.K., Churchill, D.W., Pontius, W., & Gilkey, K.M. A comparison of five diagnostic systems for childhood schizophrenia and autism. Journal of Autism and Childhood Schizophrenia, 1971, 1, 175-189.

Eckstein, R. Children of time and space, of action and impulse. New York: Appleton-Century-Crofts, 1966.

Eisenberg, L., & Kanner, L. Early infantile autism: 1943-1955. American Journal of Orthopsychiatry, 1956, 26, 556-566.

Eisenberg, L. The course of childhood schizophrenia. American Medical Association Archives of Neurology and Psychiatry, 1957, 78, 69-83.

Ferster, C.B. Positive reinforcement and behavioral deficits of autistic children. Child Development, 1961, 32, 437-456.

Forehand, R., Griest, D.L., & Wells, K.C. Parent behavioral training: An analysis of the relationship among multiple outcome measures. Journal of Abnormal Child Psychology, 1979, 7, 229-242.

Gittleman, M., & Birch, H.G. Childhood schizophrenia: Intellect, neurologic status, perinatal risk, prognosis, and family pathology. Archives of General Psychiatry, 1967, 17, 16-25.

Goldfarb, W., Goldfarb, N., & Pollack, R.C. Treatment of childhood schizophrenia. Archives of General Psychiatry, 1966, 14, 119-128.

Goldfarb, W., & Pollack, R.C. The childhood schizophrenic's response to schooling in a residential center. In P.H. Hoch & J. Zubin (Eds.), The evaluation of psychiatric treatment. New York: Grune & Stratton, 1964.

Gunning, S.V., & Holmes, T.H. Dance therapy with psychotic children: Definition and quantitative evaluation. Archives of General Psychiatry, 1973, 28, 707-713.

Halpern, W.I. The schooling of autistic children: Preliminary findings. American Journal of Orthopsychiatry, 1970, 40, 665-671.

Havelkova, M. Follow-up study of 71 children diagnosed as psychotic in pre-school age. American Journal of Orthopsychiatry, 1968, 38, 846-857.

Hayes, W.L. Statistics for the social sciences. New York: Holt, Rinehart, & Winston, 1973.

Hemsley, R., Howlin, P., Berger, M., Hersov, L., Holbrook, D., Rutter, M., & Yule, W. Treating autistic children in a family context. In M. Rutter & E. Schopler (Eds.), Autism: A reappraisal of concepts and treatment. New York: Plenum, 1978.

Hewett, F.M. Teaching speech to an autistic child through operant conditioning. American Journal of Orthopsychiatry, 1965, 35, 927-936.

Hingtgen, J.N., Coulter, S.K., & Churchill, D.W. Intensive reinforcement of imitative behavior in mute autistic children. Archives of General Psychiatry, 1967, 17, 36-43.

Hollingshead, A.B., & Redlich, F.C. Social class and mental illness. New York: John Wiley & Sons, Inc., 1958.

Holroyd, J., & McArthur, D. Mental retardation and stress on the parents: A contrast between Down's syndrome and childhood autism. American Journal of Mental Deficiency, 1976, 80, 431-436.

Jacobson, N.S., & Baucom, D.H. Design and assessment of non-specific control groups in behavior modification research. Behavior Therapy, 1977, 8 , 707-719.

Jacobson, N., & Martin, B. Behavioral marriage therapy: Current status. Psychological Bulletin, 1976, 83, 540-556.

Johnson, S.M., & Bolstad, D.D. Methodological issues in naturalistic observation: Some problems and solutions for field research. In L.A. Hamerlynch, L.C. Handy, & E.J. Mash (Eds.), Behavior change: Methodology, concepts, and practice. Champaign, Ill.: Research Press, 1973.

Kanner, L. Autistic disturbances of affective contact. The Nervous Child, 1943, 2, 217-250.

Kent, R.N., & Foster, S.L. Direct observational procedures: Methodological issues in naturalistic settings. In A.R. Conners, K.S. Calhoun, & H.E. Adams (Eds.), Handbook of behavioral assessment. New York: Wiley, 1977.

Kiesler, D.J. Experimental designs in psychotherapy research. In A.E. Bergin, & S.L. Garfield (Eds.), Handbook of psychotherapy and behavior change: An empirical analysis. New York: Wiley, 1971.

Koegel, R.L., & Covert, A. The relationship of self-stimulation to learning in autistic children. Journal of Applied Behavioural Analysis, 1972, 5, 381-387.

Koegel, R.L., Glahn, T.J., & Nieminen, G.S. Generalization of parent training results. Journal of Applied Behavioural Analysis, 1978, II, 95-109.

Kolvin, I. Psychoses in childhood: A comparative study. In M. Rutter (Ed.), Infantile Autism: Concepts, characteristics, and treatment. London: Churchill-Livingstone, 1971.

Kozloff, M. Reaching the autistic child: A parent training program. Champaign, Ill.: Research Press, 1973.

Leff, R. Behavior modification and the psychoses of childhood. Psychological Bulletin, 1968, 64, 396-409.

Lockyer, L., & Rutter, M. A five-to-fifteen year follow-up of infantile psychosis III. Psychological aspects. British Journal of Psychiatry, 1969, 115, 865-882.

Lotter, V. Social adjustment and placement of autistic children in Middlesex: A follow-up study. Journal of Autism and Childhood Schizophrenia, 1974, 4, 11-32.

Lotter, V. Follow-up studies. In M. Rutter & E. Schopler (Eds.), Autism: A reappraisal of concepts and treatment. New York: Plenum, 1978.

Lovaas, O.I. Behavior therapy approach to the treatment of childhood schizophrenics. In J. Hill (Ed.), Minnesota symposia on child psychology (Vol. 1). Minneapolis: University of Minnesota Press, 1967.

Lovaas, O.I., Berkenich, J.P., Perloff, B.F., & Schaeffer, B. Acquisition of imitative speech by schizophrenic children. Science, 1966, 151, 705-707.

Lovaas, O., Koegel, R., Simmons, J., & Long, J. Some generalization and follow-up measures on autistic children in behavior therapy. Journal of Applied Behavioral Analysis, 1973, 6, 131-166.

Lovaas, O.I., Freitas, L., Nelson, K., & Whalen, C. The establishment of imitation and its use for the development of complex behavior in schizophrenic children. Behavior Research and Therapy, 1967, 5, 171-181.

Lovaas, O.I., Schaeffer, B., & Simmons, J.Q. Experimental studies in childhood schizophrenia: Building social behavior in autistic children by use of electric shock. Journal of Experimental Research in Personality, 1965, 1, 99-109.

Mahler, M. On child psychosis and schizophrenia: Autistic and symbiotic psychoses. Psychoanalytic study of the child (Vol. 7). New York: International Universities Press, 1952.

Marcus, L.M. Patterns of coping in families of psychotic children. American Journal of Orthopsychiatry, 1977, 47 (3), 388-399.

Marcus, L.M., Lansing, M., Andrews, C.E., & Schopler, E. Improvement of teaching effectiveness in parents of autistic children. Journal of the American Academy of Child Psychiatry, 1978, Vol. 17, 625-639.

Martin, B. Brief family intervention: Effectiveness and the importance of including the father. Journal of Consulting and Clinical Psychology, 1977, 45, 1002-1010.

McCall, R.B., & Appelbaum, M.I. Bias in the analysis of repeated measures designs: Some alternative approaches. Child Development, 1973, 44, 401-415.

McConnell, O.L. Control of eye contact in an autistic child. Journal of Child Psychology and Psychiatry, 1967, 8, 249-255.

Menolascino, F.J., & Eaton, L. Psychosis of childhood: A five year follow-up study of experience in a mental retardation clinic. American Journal of Mental Deficiency, 1967, 72, 370-380.

Metz, J.R. Conditioning generalized imitation in autistic children. Journal of Experimental Child Psychology, 1965, 2, 389-399.

Minuchin, S. Families and Family Therapy. Cambridge: Harvard University Press, 1974.

Mischel, W. Personality and assessment. New York: Wiley, 1968.

Murray, E.J., & Jacobson, L.I. The nature of learning in traditional and behavioral psychotherapy. In A.E. Bergin, & S.L. Garfield (Eds.) Handbook of Psychotherapy and Behavior Change: An Empirical Analysis. New York: Wiley, 1971.

Ney, P.G., Palvesky, A.E., & Markley, J. Relative effectiveness of operant conditioning and play therapy in childhood schizophrenia. Journal of Autism and Childhood Schizophrenia, 1971, 1, 337-349.

Nordquist, V.M., & Wahler, R.G. Naturalistic treatment of an autistic child. Journal of Applied Behavioural Analysis, 1973, Vol. 6, No. 1, 79-87.

O'Dell, S. Training parents in behavior modification: A review. Psychological Bulletin, 1974, 81, 418-433.

Patterson, G.R., & Fleishman, M.J. Maintenance of treatment effects: Some considerations concerning family systems and follow-up data. Behavior Therapy, 1979, 10, 168-185.

Patterson, G.R., & Guillon, M.E. Living with Children: New Methods for Parents and Teachers. Champaign, Ill.: Research Press, 1968.

Patterson, G.R., & Reid, J.B. Intervention for families of aggressive boys: A replication study. Behavior Research and Therapy, 1973, 11, 383-394.

Reichler, R.J., & Schopler, E. Observations on the nature of human relatedness. Journal of Autism and Childhood Schizophrenia, 1971, 1, 283-296.

Reichler, R.J., & Schopler, E. Developmental therapy: A program model for providing individual services in the community. In E. Schopler & R. Reichler (Eds.), Psychopathology and child development. New York: Plenum, 1976.

Rimland, B. Infantile autism. New York: Appleton-Century-Crofts, 1964.

Rimland, B. High dosage levels of certain vitamins in the treatment of children with severe mental disorders. In D. Hawkins & L. Pauling (Eds.), Orthomolecular psychiatry. San Francisco: W.H. Freeman, 1973.

Risley, T., & Wolf, M. Experimental manipulation of autistic behavior and generalization into the home. In R. Ulrich, T. Stachnik, & J. Mabry (Eds.), Control of human behavior. Glenview, Ill.: Scott-Foresman, 1966.

Ruttenberg, B.A. A psychoanalytic understanding of autism and its treatment. In D.W. Churchill, G.D. Alpern, & M.K. DeMyer (Eds.), Infantile autism: Proceedings of the Indiana University Colloquium. Springfield, Ill.: Thomas, 1970.

Rutter, M. The description and classification of infantile autism. In D.W. Churchill, G.D. Alpern, & M.K. DeMyer (Eds.), Infantile autism: Proceedings of the Indiana University Colloquium. Springfield, Ill.: Thomas, 1970.

Rutter, M. Childhood schizophrenia reconsidered. Journal of Autism and Childhood Schizophrenia, 1972, 2, 315-337.

Rutter, M. Diagnosis and definition. In M. Rutter & E. Schopler (Eds.), Autism: A reappraisal of concepts and treatment. New York: Plenum, 1978.

Rutter, M., & Bartak, L. Special educational treatment of autistic children: A comparative study. II. Follow-up findings and implications for services. Journal of Child Psychology and Psychiatry, 1973, 14, 241-270.

Rutter, M., Greenfield, D., & Lockyer, L. A five-to-fifteen-year follow-up study of infantile psychosis. II. Social and behavioral outcome. British Journal of Psychiatry, 1967, 113, 1183-1197.

Rutter, M., & Schopler, E. (Eds.) Autism: A reappraisal of concepts and treatment. New York: Plenum, 1978.

Rutter, M., & Sussenwein, F. A developmental and behavioral approach to the treatment of pre-school autistic children. Journal of Autism and Childhood Schizophrenia, 1971, 1, 376-397.

Schecter, M.D., Shurley, J.T., Tousieng, P.W., & Maier, W.J. Sensory isolation therapy of autistic children: A preliminary report. Journal of Pediatrics, 1969, 74, 564-569.

Schopler, E. Parents of psychotic children as scapegoats. Journal of Contemporary Psychotherapy, 1971, 4, 17-22.

Schopler, E., Andrews, C., Strupp, K. Do autistic children come from upper-middle-class parents? Journal of Autism and Developmental Disabilities, 1979, 9, 139-151.

Schopler, E., Brehm, S.S., Kinsbourne, M., & Reichler, R.J. Effect of treatment structure on development in autistic children. Archives of General Psychiatry, 1971, 24 415-421.

Schopler, E., Mesibov, G.B., Devellis, R.F., & Short, A. Treatment outcome for autistic children and their families. In P. Mittler (Ed.), Proceedings of the Fifth Congress of the International Association for the Scientific Study of Mental Deficiency. Baltimore: University Park Press, in press.

Schopler, E., & Reichler, R.J. Developmental therapy by parents with their own autistic child. In M. Rutter (Ed.), Infantile autism: Concepts, characteristics and treatment. London: Churchill-Livingstone, 1971.

Schopler, E., & Reichler, R.J. Individualized Assessment and Treatment for Autistic and Developmentally Disabled Children. Volume I, Psychoeducational Profile. Baltimore: University Park Press, 1979.

Schopler, E., Reichler, R.J., DeVellis, R.F., & Daly, K. Toward Objective Classification of Childhood Autism: Childhood Autism Rating Scale (CARS). Journal of Autism and Developmental Disabilities, in press.

Schopler, E., & Rutter, M. Sub-groups vary with selection purpose. In M. Rutter & E. Schopler (Eds.), Autism: A reappraisal of concepts and treatment. New York: Plenum, 1978.

Scott, P.M., Burton, R.V., & Yarrow, M.R. Social reinforcement under natural conditions. Child Development, 1967, 38, 53-63.

Sidman, M. Tactics of scientific research. New York: Basic Books, 1960.

Sloane, R.B., Staples, R.F., Cristol, A.H., Yorkston, N.J., & Whipple, K. Psychotherapy Vs. Behavior Therapy. Cambridge: Harvard University Press, 1975.

Speers, R.W., & Lansing, C. Group therapy in childhood psychosis. Chapel Hill: University of North Carolina Press, 1965.

Strupp, H.H., & Bergin, A.E. Some empirical and conceptaul bases for coordinated research in psychotherapy: A critical review of issues, trends, and evidence. International Journal of Psychiatry, 1969, 7, 19-90.

Treffert, D.A., McAndrew, J.B., & Dreifurst, P. An inpatient treatment program and outcome for 57 autistic and schizophrenic children. Journal of Autism and Childhood Schizophrenia, 1973, 3, 138-153.

Wahler, R.G. Setting generality: Some specific and general effects of child behavior therapy. Journal of Applied Behavioural Analysis, 1961, 3, 239-246.

Wahler, R.G., House, A.E., & Stambaugh, E.E. Ecological assessment of child problem behavior. New York: Pergamon Press, 1976.

Wenar, C., Ruttenberg, B.A., Dratman, M.L., & Wolf, E.G. Changing autistic behavior: The effectiveness of three milieus. Archives of General Psychiatry, 1967, 17, 26-35.

Wetzel, R.J., Bahe, J., Roney, M., & Martin, M. Outpatient treatment of autistic behavior. Behavior Research and Therapy, 1966, 4, 169-177.

Wolf, M., Risley, T., & Mees, H. Application of operant conditioning procedures to the behavior problems of an autistic child. Behavioral Research and Therapy, 1964, 1, 305-312.

Zaslow, R.W., & Breger, L. A theory and treatment of autism. In L. Breger (Ed.), Clinical-cognitive Psychology: Models and integrations. Englewood Cliffs, N.J.: Prentice-Hall, 1969.

APPENDICES

APPENDIX A

BEHAVIORAL OBSERVATIONS (adapted from Lovaas et al., 1973; Wahler et al., 1976; and Hemsley, personal communication)

General Instructions to Observers

The study calls for each observer to code behaviors over a 90 minute period. During this time each rater will be observing and coding for 60-70 minutes, and never for longer than 20 minutes without a break. Breaks will range from 5 to 20 minutes and will be distributed throughout the total period of observation.

The two observers should seat themselves so that they cannot see the other's scoring sheet. However, they will have to sit close enough to each other so that they both can use earplugs wired to a tape recorder located between them. They should also be in position to see all the activity that will occur in the area designated for the observations.

The rating will be a "yes or no" assessment of the occurrence of each of the behaviors described below over a ten second interval. The observer will be listening to a tape which marks the beginning of observation periods with "look" and the beginning of recording periods with "rate." The rater will observe the adult-child interaction for an entire 10 second period. At the signal ending this period, he/she will stop observing in order to code behaviors. The scoring sheet has a box for each behavior in each 10 second interval. The observer will have 10 seconds to mark the occurrence of each behavioral category. If any instance of a given category of behavior occurred during the previous 10 second interval, a "1" should be placed in the box corresponding to the behavior and interval. The rater should mark a break by drawing double vertical lines following the last 10 second interval that he rates and just before the first interval that he next rates.

A final comment: When you are uncertain about whether or not to score a behavior "1" and you cannot decide, do not score it.

Adult Behavior Categories

There are three basic types of adult behavior categories: the three "guidance" categories, social attention, and aversive communication. The guidance categories refer to adult behaviors which facilitate the child's task performance in a given interval. Task performance is defined as child behavior that would be coded as Appropriate Play or Work (see PW below). Social attention refers to other actions an adult performs that are directed at the child. Since the guidance categories are, in a sense, subsets of social attention, you should not score social attention when you score any guidance categories. More than one guidance category can be scored in one interval, however. Finally, aversive communication can be scored in the same interval as any of the other adult categories.

1. Verbal Guidance (VG). This category is a measure of the degree to which adults use verbal communication to actively structure the child's activity. The category should be scored when, and only when, an adult says something to the child which is intended to be an aid or a prompt facilitating the child's performance of a task. The category should be scored regardless of whether or not the child responds to the adult's actions.

Examples of VG include instructions and immediate feedback to the child in the form of praise or corrections. Score a given command only once unless it is modified significantly to facilitate the child's performance [e.g., "Would you bring me the pretty book" (spoken as a command) becomes "Bring me the book"; "Put this piece in the right hole" becomes "Put it in"]. Thus, repeated instructions which are unchanged in form do not score although the first in a series of repeated instructions does. If a previously used command is used in a new situation or at a different time, do score it. You will have to use your judgment about whether or not a new situation exists. Usually it will be separated from the original situation by another activity or an interruption.

2. Gestural Guidance (GG). This category is a measure of the degree to which adults actively structure the child's activity by means of gestures and visual demonstration. The category should be scored for a given interval when, and only when, an adult performs actions which are an attempt to facilitate through visual displays the child's performance of a task. The category should be scored regardless of whether or not the child responds to the adult's actions.

Examples include the use of sign language and simple gestures such as pointing. They also include the adult's performing the task as a demonstration for the child (if such a demonstration involves the manipulation of materials). GG should also be scored when the adult hands the child materials or puts them in front of the child, indicating that the child is to do something with them.

3. Physical Guidance (PG). This category is a measure of the degree to which adults actively structure the child's activity by physically manipulating the child in an attempt to facilitate his performance of a task.

Examples include the adults guiding the child through a response or physically managing difficult behavior which is interfering with a task that the adult wants the child to perform. The latter might include turning the child's head towards the adult or some materials or holding the child's hand to prevent self-stimulatory behavior. It may also include moving the chair a child is sitting in to facilitate his performance. Finally, hugs or other positive touching of the child is scored when it is a reward for, or otherwise is a guide for, task performance.

4. Social Attention (SA). This category is scored for any deliberate physical contact made by an adult with the subject (placing a hand on his shoulder, hugging him), verbalizations directed to the subject ("Bob, how are you?") and mutual looking at each other entailing recognition demonstrated through other non-verbal cues (smiling and/or being smiled at, and other mutual changes in facial expression).

Note: Do not score SA if VG, GG, or PG are scored.

5. Aversive Communication (AC). This category is scored when any instance of SA, VG, GG, or PG is judged to be aversive because of the verbal content, voice quality, or the assertive behavior of the adult who makes the scored response. See the definition of "aversive"below. The category is always scored in addition to some other adult category or categories.

Definition of aversive:

a) Aversive because of content:
   1) The instruction contains a threat of punishment or unpleasant consequences to the child. ("Stop that, or you'll go to your room.")
   2) The instruction contains ridicule. ("You can't do anything right, give me that pencil.")

b) Aversive because of voice quality:
   1) The instruction is spoken loudly or shouted.
   2) The instruction is spoken in a "threatening" tone of voice, which may be high-pitched or low and measured as if the speaker is exercising "control."

c) Aversive because of the assertive behavior of the speaker:
   1) The instruction is accompanied by grabbing the child, pushing the child aside, striking him/her, grabbing the object concerned, etc.

d) If the observer judges any of the above criteria as mock or playful the instance is not considered aversive.

Child Behavior Categories

There are two basic groups of child behavior categories. The first comprises interactions with people, appropriate use of objects, and other appropriate activities. This group includes social approach, social interaction with adults, social interaction with children, appropriate play or work, and meaningful communication. The second group comprises psychotic

behaviors, inappropriate use of objects, and lack of interaction. This group includes echolalia, self-stimulation, repetitive object play, and sustained non-interaction.

6. Social Approach (A). This category is scored for any instance of spontaneous physical or verbal contact with an adult initiated by the subject. It is scored for any instance of deliberate physical contact, directed verbalizations, or other non-verbal methods used by the subject to attract another's attention or to initiate an interaction. Spontaneous refers to the requirement that the contact between the subject and the other person not be initiated by that other person, or be preceded by any cues from that other person. If the interaction begun by the subject's approach is terminated in the interval in which it was started and begun again by the subject it is scored as Social Approach in both intervals. If the interaction started by the subject's approach is carried uninterrupted into subsequent intervals, it is scored as social interaction (see below) in those subsequent intervals.

7. Social Interaction with an Adult (SIA). This category is scored for any instance of the child's interaction with adults. Interaction in this instance implies that the behavior of the child is either directed at the adult or is a response to some behavior of the adult.

Because of the nature of this category, you will always score an adult behavior category along with SIA. Social Interaction with Adults (SIA) and Social Interaction with Children (SIC) may be scored in the same interval if the subject interacts with both children and adults.

Examples of behavior directed at the adult include saying (or signing) something to them, touching them, and mutual looking at the adult entailing recognition demonstrated through other non-verbal cues (smiling and being smiled at, or other mutual changes in facial expression). If an interaction is initiated by the child, the first interval is scored as Social Approach (A) and subsequent intervals of continued interaction are scored as SIA until the interaction is terminated.

Examples of behavior as a response to behavior by an adult include following an instruction, taking something the adult has handed to the child, and laughing at an adult's joke or other humorous action. Also included are responses which appear to be contingent upon some behavior by an adult which is directed at the child. For instance, an adult points to a peghole and the child picks up a peg, apparently in response to the adult's gesture. Instances in which an adult moves the child, manipulates part of his body, or moves the object on which he sits score as SIA since the child cannot avoid making some sort of response (i.e., the one that the adult guides them through). If an adult is holding the child in his lap, it also scores as SIA.

If an adult simply touches the child, even if it is a warm or communicative gesture, score SIA only if the child makes some response. In any other case as well, if an adult initiates an interaction and the child does not respond, do not score SIA. If the adult demonstrates a task or makes a gesture directed at the child and the child orients to the adult, clearly observing the adult's action, score it as SIA.

8. Social Interaction with a Child (SIC). This category is scored for any instance of the child's interaction with another child. Interaction implies that the behavior of the child is either directed at the other child or is a response to some behavior of the other child. Since there is no category of social approach towards another child, intervals in which the subject approaches another child are scored under SIC.

Examples of SIC are similar to those for SIA with the exception that the person that the child interacts with is another child rather than an adult.

9. Appropriate Play or Work (PW). This category provides a measure of the amount of appropriate activity in which a child engages. Such activity includes play with toys and work with developmental tasks.

Sample activities in this category involve exploration and manipulation of objects. The child may show interest but inability to use objects properly. He may be using them for play [rather than repetitive object play (RP), for instance] but is not, necessarily, using them as they were intended. In these instances, appropriate play is scored.

He may be stacking tiles or blocks, scattering things, putting crayons in boxes, handling and examining various toys, pouring water into containers, etc. Here you must make the distinction between handling or examining and storing or using objects in a bizarre, repetitive, or stereotyped manner (see RP below).

He may pile up objects, fit pegs in a peg board, ring the telephone, scribble with crayons, pull a wagon, turn pages in a book, or make a rattle by placing small objects in a larger one. This category also includes caretaking activities such as washing, toileting and dressing, but not eating.

In more complex games and use of objects, there may be a dependency of one response on another. One response leads to or proceeds from another in the accomplishment of some project. Examples include making a pattern or picture with tiles or crayons, building an object with blocks, reading, pulling the wagon to transport objects for a project, and completing a puzzle.

Finally, this category includes any behavior that is prompted, requested, or commanded by an adult. Examples might include saying a word, signing, opening a door, or standing up.

10. Meaningful Communication by speech or gesture (MC). This behavior comprises intelligible, non-repetitive speech or communicative gestures which are appropriate to the situation. The key elements are that the child is clearly attempting to communicate something to someone, and does so with an action (verbal or gestural) the meaning of which is readily understandable.

If the child answers a question, makes a comment, labels an object, carries on a conversation, or reads aloud, you should record the behavior as meaningful communication. Include everything from the most primitive

use of words, such as a simple "hi" or "go" (when the child is trying to leave), to the most complex conversation.

Gestures may involve simple demands that a child makes, for instance, grabbing an adult's hand and tugging him toward the door. It also includes more complex gestures such as sign language. You need not understand sign language to rate this behavior, but you will have to make a judgment about whether a gesture is a meaningful or is a random or stereotyped movement.

11. Echolalia and other Non-Meaningful Language (EC). Recording this behavior signifies that the child is using words in an unmeaningful or inappropriate manner. This type of behavior may present itself in one of several ways.

He may say things that sound like commands or statements he once heard, but which have nothing to do with his present activity, or the context in which he is operating. He may use phrases like some of the following: "Hello John.", "No, John.", or "How are you, John?".

Secondly, the child may use bizarre speech, sounding like a word salad. The words may be understandable separately, but do not make any sense when used together. Examples are, "green rabbit", "Bufferin, one, two, three", or "happy puppy baby little". You may be able to think of this sound as input for the sake of the input, much like a verbal version of self-stimulation.

Finally, another class of behavior included in this category is immediate echolalia. For example, the adult may say "How are you, John?" and the child will answer "How are you, John?". The adult may say "Now it's time to draw," and the child will say "draw". You will not have to record babbling. Also, do not record humming, grunting, squealing, or any sound which is unintelligible (including fussing or crying).

12. Self-Stimulation (SS). The best way to describe the various forms this kind of behavior may take is to begin with the head. He may stick his tongue out repeatedly. He may rock his whole head from side to side.

There are several typical forms of self-stimulation performed with the arms and shoulders. The child may move the arms up and down the sides of his body, flapping his hands from the wrist. He may flap his arms from the shoulder with his hands limp.

Using his whole torso, the child may engage in body rocking. Rocking usually occurs in some sitting position and is a forward and back motion more often than side to side. He may jump repeatedly or run from wall to wall. He may walk on his toes.

All of these behaviors have the common appearance of producing sensory input for no other purpose than the stimulation itself. There is, however, a fine line between some of these behaviors and some of the more primitive forms of play. You should consider behavior self-stimulation when the child begins to repeat a gesture or an act over and over again during self-stimulation.

Observers will watch the child for at least 15 minutes before starting to record behaviors. During this time they will identify self-stimulatory behavior that is idiosyncratic to the particular child. A note will be made of this behavior for future visits, and instances of it will be recorded as SS.

Do not score SS in cases where self-stimulatory behaviors include the manipulation of an object that constitutes RP. In such a case, score RP but not SS.

Self-stimulatory behavior occurs to some extent in the repertoires of all children, and even to some extent in adults. You may find yourself recording something you feel looks like something any child might do. Record it anyway. The difference is that you may see more of it than you might in a normal child. However, if you are unsure that the behavior fits the above description, do not score it.

13. Repetitive Object Play (RP). This category is scored for any simple and inappropriate repetitive manipulation or repetitive touching of an object (e.g., pencil, book, peg, table, curtain) in which the handling is not part of appropriate play or work nor is it a form of activity for which the object or toy was intended. A repetitive manipulation is defined as one continuing for three or more, essentially identical, occurrences during a single ten-second interval. For continued scoring of RP, this criterion must be met in each interval so scored. Object play usually involves the subject's hands and active movement of an object. It is likely to appear to provide tactile stimulation to the subject.

Note: Repetitive object play is never scored for the child's appropriate use of an object (see PW for definition of appropriate), nor is it scored for repetitive movements in touching a person.

14. Sustained Non-Interaction (NI). This category is scored when the subject does not interact with people or appropriately with objects for a full ten-second interval. Object contacts which qualify as repetitive object play can be scored during a non-interaction interval as can self-stimulation and echolalia.

NI cannot be scored in an interval in which any of the following occur: MC, A, SIA, SIC, or PW. There may or may not be an adult category scored during an interval scored for NI.

15. Obstruct (OBS). Observers should write OBS in any interval in which visual contact with the subject is interrupted for more than a brief moment. If obstruct is written in, no other category is scored in that interval.

APPENDIX B

INTERVIEW PROCEDURES

Introduction to Interview

(The following is a model for introducing a parent to the nature and rules of the problem-focussed interview during the first evaluation. The basic form and content of the introduction should be the same for all families. The exact wording should differ according to the linguistic style of the parent and the interviewer's sense of the parent's need for clarity or reassurance around particular issues. Most of the contents of the introduction will be repeated before each subsequent interview at subsequent evaluations in order that families approach the interview with the same cognitive set, to the extent that this is possible.)

Division TEACCH is a program designed to help families understand and deal with children who have communication handicaps and behavior problems that are quite serious. Research has shown that the problems of these children are almost never caused by their parents. In fact, the staff at TEACCH finds that they can help the family best as consultants - people who teach parents how to treat their own children in their homes and help parents with the very special problems that these children present.

We know that these children can make things difficult for their families as a result of their handicaps. Some children require much extra attention, which can make it hard for parents to do things they want to do. Other children are hard to control and may do things which are dangerous for themselves or other people, or are destructive to household items. Many children do things which are embarrassing so their parents don't go out to public places with them. Because many children who come to TEACCH don't communicate well, it can be hard for the family to understand what the child wants. It can also be difficult for parents to get the child to understand what they are trying to tell them. These and many other things can make things difficult for the family.

Part of the research that you are helping with is designed so that TEACCH can get a better understanding of these sort of problems. For the next 45 minutes or so, we will be talking about the sort of difficulties that you and your family experience in your life with _____. I will be asking many questions about the effect of these difficulties on your family. The more you are able to give details about these, the more we will learn in our effort to understand and help families that we serve.

I will be making an audio-tape of our conversation so that two of my colleagues can listen to the tape and get an accurate picture of the types of difficulties you face. They will be the only people other than you and I to know what was said here. In order to assure high scientific standards in this research, I will set certain rules concerning our discussion.

We will talk about things that have been going on for quite a while. However, I would like you to focus on the last week or so in talking about them. In other words, let's discuss the ways in which these things affect your family right now. Do you understand?

We will be talking about the same issues in the same way each time that I visit you. Each time I would like you to give me as accurate a picture as possible of the ways in which _____ is affecting how your family is operating at that time. It is important that we do this in the same way each time so that we can look at the way these problems change with time.

It is important in having these discussions that, while the tape is running, you do not mention anything about TEACCH or other help you have or haven't received. Just talk about what's been happening recently in your home. You should also avoid talking about visits I have made in your home before or ones I will make later. I will follow these rules, also. This will make it possible for the person listening to the tape to focus on what is actually happening in your home and not be influenced by knowledge of what sort of help you've had. He will be able to be more objective in his judgment and this is important for scientific purposes.

Okay. In a minute, we will talk about the problems you have with _____. Do you have any questions about what I've said so far? Are the rules clear? [time for response]

Allright, now I'd like you to take a minute or so to think about the one or two things about _____ that are hardest for you and most disruptive to the family in your daily lives. [time for thought]

(The interviewer will then help the parent briefly clarify the problem areas. Then he will turn on the audiotape.)

Now the things we will talk about are...

[After stating the problem areas, the interviewer will follow the line of questioning indicated under "Interview topics" (see below).]

Interview Topics

Nature and severity of child's behavior

What specifically does the child do that is problematic? (ask for examples from past week)
How often does the behavior occur? (How often last week? Is that typical?)

Family contexts in which the problem has an effect

Times at which problem arises?
When is it most problematic?
Individual family members affected? (ask about each)
Accommodations to problem by the family?
In what other ways does problem make things difficult in the home?

Effects on the interface between the family and society

Does the problem make it difficult for family to get out more? (e.g., church, store)
How well do outsiders understand child's problem? (relatives?)
Does problem affect the availability of babysitters?
Do sibs avoid bringing friends home due to child's problem?
Is one or both parents' activity restricted? (social or work)
Do the parents avoid bringing visitors to the home due to the child's problem?
What was the family's social life like before the child was born?

Efforts to deal with the problem

What does mother think is the best way to handle problems?
What other things did they try?
What do other family members think? (especially father)
What in fact happens? (have her describe a recent incident)
What does she think is a reasonable expectation of the child in the problem area?

Emotional reaction of family members (especially mother) and conflicts among family members

How does problem make mother feel?
How does it make other family members feel?
Does mother sometimes feel she is responsible for problem?
How does father help mother deal with child's problem? (emotional and practical support)
Are child's sibs jealous of the attention he gets?
In what other ways does problem cause conflicts in the family?

Mother's understanding of child's problems

What does mother see as the reason for the child's problems?
What does mother consider to be the child's main strengths and weaknesses?

APPENDIX C

RATINGS OF IMPACT OF CHILD PROBLEMS ON FAMILY FUNCTIONING

The rating scale which follows is an attempt to cover under seven headings many ways in which a disturbed or handicapped child might have a negative effect upon his family's functioning. Under each heading are examples of issue that are relevant to the heading. Your task as a rater is to assign a rating of the degree of severity of the type of problems under a given heading to each family at the time of the interview that you listen to. Thus, for each interview, you will make seven ratings, each of a different type of issue, on the nature of the effect of a child with problems upon his/her family.

The ratings will be made on a 0-4 scale with "0" indicating "No problem" and "4" indicating "Severe problem." Examples of degrees of problems fitting each level of severity are given.

Because the scale attempts to cover broad areas of family functioning and each family will have unique problems, it is impossible to list as examples all the possible problems that fit under each heading or to list all the degrees of problems calling for a given rating of severity. Therefore, raters should use the examples as guidelines for adapting other problems to the scale. Further, none of the specific problems given as examples need be present to make a given rating of severity, assuming other problems seem to be comparable to the examples listed.

Ratings of the level of severity may involve either a single issue or several. A moderate rating, for instance, could involve one fairly serious problem or several problems which, if viewed individually, would not be considered serious.

You will listen to an audio-tape of an interview with the child's mother. The interviewer will begin the taped segment by stating the target problem(s) to be discussed in the interview. The interview will then cover the effect of the child's disorder upon family and extra-family life using the target problem(s) as a focus. As you listen to the interview, jot down in the indicated space notes concerning information important in making each rating. Feel free to go back over part or all of the tape as you listen or after you have heard the whole interview once. Make sure you have listened to the entire interview before making your rating. Finally, be sure to circle just one rating for each of the seven scales of severity.

Dimensions and Rating of Problem Severity and Impact

1. Severity of Child's Problem Behavior - This is a rating of the child's problem behavior itself, apart from the family's response to it. It should be made on the basis of two parallel dimensions with the main empnasis being on one or the other depending on the nature of the problem: (a) the degree to which the behavior is difficult to handle or noxious; and (b) the degree to which it is maladaptive for the child, either in the sense that it marks a maladaptive pattern in itself (e.g., communication deficits) or that it is likely to interfere with adaptive behaviors (e.g., refusal to interact with others). Although this rating is to be made from the mother's description of the child's behavior, the rater should attempt to make this judgment as independently as possible of the mother's perception of severity. The child's behavior should be compared with that of other children that the rater has known with similar problems to help in developing a framework within which to rate severity.

To assess a difficult or noxious behavior, raters should consider the frequency and intensity of the behavior. They should also make a judgment of the degree to which the behavior is in fact difficult to handle and offensive. For example, frequent and intense hand flapping should be rated as less severe than frequent and intense tantrums.

To assess deviations from, or interference with, adaptive behavior, raters should be mindful of a range of types of behaviors, including those involved in self-help tasks, social interaction, and developmental learning. Adaptive deficits should be evaluated in terms of their importance in the child's daily life and the extent to which they deviate from age appropriate behavior.

In the following examples of ratings, ideas will be presented concerning ratings for both (a) difficult and (b) maladaptive behaviors.

0 - No problem - The child exhibits neither (a) difficult nor (b) maladaptive behavior in the identified problem area.

1 - Doubtful or trivial - (a) The child occasionally exhibits difficult behavior but it is so rare or mild as to be of little concern; (b) The child shows adaptive deficits but they are only marginally important or only slightly deviant, and are not likely to have a significant effect on this overall adaptive functioning.

2 - Mild - (a) The child at times exhibits difficult or noxious behavior, that is clearly more severe than what would be expected of a normal child; (b) The child shows a significant deficit in adaptive functioning although he may have a good deal of functional skill in the deficit area.

3 - Moderate - (a) The child regularly exhibits difficult or noxious behavior; (b) The child's adaptive functioning is very limited in a given area. Alternatively, his adaptive functioning in several areas may be more mildly impaired by the identified deficit.

4 - Severe - (a) The child exhibits difficult behavior at a high rate each day; (b) The child shows no adaptive behavior in some important area of functioning or shows severe deficits in several areas stemming from the identified problem.

2. Mother's Emotional Upset - This is a rating of the extent to which the mother is emotionally upset by the problems of the child. The mother may be anxious or depressed about the child's behavior, or feel guilty thinking that she has caused it. She may get angry at the child. She may be frustrated and feel incapable of handling her child. It is also possible that a mother takes special pride in her ability to provide for her child. This rating will be made primarily from the mother's description of her own feelings. However, you should also pay attention to the way she talks about the problem and the way she presents her feelings. You will get clues concerning nature of her emotional involvement as she discusses the occurrence, and her handling, of the problem. For instance, she may spend much time and energy applying a futile and frustrating management technique, yet deny that she is particularly concerned with a problem. In such a case, you should judge the degree of upset as best you can in spite of her denial. The same principle applies to cases where the emotional tone of the mother's description contradicts the content of what she is saying. An extreme example of this would be a tense, tearful woman stating that her child's problem "isn't too bad." It will be best for purposes of accuracy if you rely primarily on what a mother says her feelings are, keeping in mind the need to adjust your rating when the mother's account does not appear to be accurate.

0 - No problem - The mother does not appear to be unusually upset by the child's problems. She may appear to derive emotional strength from her handling of the problems.

1 - Doubtful or trivial - The mother may feel that the problems are a nuisance. She occasionally worries about them but is generally not concerned about them.

2 - Mild - The mother is definitely worried about the problems. She may be occasionally anxious or depressed about them. At times she may become very angry with the child over the problems. She may also feel hurt by the child's behavior, taking it as a personal response to her.

3 - Moderate - The mother may often be anxious or depressed about the problems. She may be frequently angry with, or feel hurt by, the child. Her feelings may significantly affect how she handles the child.

4 - Severe - The mother is herself impaired in her functioning in response to her emotional involvement with the child. She may, for instance, be very bitter towards the child, or feel hopeless, incompetent, or consumed with guilt.

3. Discord in Family System - This refers to the degree to which conflict, lack of support, or isolation, occurs among family members as a result of, or in reference to, the child's problem. Such discord can occur in any sub-group of family members, although you should not include conflict between the mother and the child with the problem in your consideration of this rating. (This is because conflict in the mother-child subsystem should be reflected in either "severity of the child's problem behavior" or "mother's emotional upset.") Examples of evidence of conflict in the family system include: (1) conflict between the parents over how to handle the target problem or other aspects of the child's behavior; (2) verbally expressed jealousy of the problem child due to the special attention accorded the child with the problem; (3) other conflict between the problem child and his sibling(s) resulting from the behavior of the former. Discord may also take the form of distance between family members. Examples include: (1) the mother's complaining that her husband does not help her deal with their difficult child (3 - moderate); (2) the mother's stating the difficult child is her responsibility and that her husband has very little to do with the child (2- mild); (3) siblings withdrawing from family interactions apparently in response to the central focus being placed on the problem child. As with "mother's emotional upset", you will have to rely primarily on the mother's report of the presence and severity of conflict, and adjust your rating according to your reading of the situation. In this category, you will need to synthesize more diverse information since evidence of conflict can arise at any point in the interview and can refer to different persons and situations. In making this rating, give the most weight to the most serious conflict discussed. A single conflict can be great enough in itself to earn a rating of "4." However, several smaller conflicts should be considered cumulative also, possibly earning a "4" if the total effect on the family is sufficiently serious.

0 - No problem - There is no evidence of conflict between family members concerning the behavior and management of the problem child.

1 - Doubtful or trivial - Parents may disagree on how to handle the child but are able to resolve these differences and achieve unity and consistency in their handling of the child. Siblings may occasionally become upset with the problem child or with their parents in relation to the child, but are able to resolve these feelings quickly. The father or siblings may tend to take a secondary role in the family in relation to an intense relationship between the mother and the problem child.

2 - Mild - Parental disagreement over the handling of the problem child results in each handling the child in a different way, or in one of the parents restricting his/her interaction with the child. Siblings may have repeated conflicts with the problem child or their parents, which, although not the source of much emotional stress, reflect an unresolved and problematic issue. Other family members may take a clearly secondary role in relation to the interaction of one of the parents and the problem child.

3 - Moderate - This rating may consist of some of the same type of interactions as "2 - Mild". However, to be scored 3, the interactions must be the source of either ongoing tension between family members or a rigid separation of roles which tends to isolate family members (particularly spouses) from one another. For instance, a husband may frequently criticize his wife's handling of their child. On the other hand, he may have "given up" and turned the full responsibility for handling the child over to the mother. Siblings may regularly express negative feelings about the problem child. Finally, this rating may also be made if there are several conflicts of the type described as mild, and these appear to have a significant overall effect upon the family.

4 - Severe - Conflict between the parents concerning the problem child is seriously affecting their marital relationship. Conflict with the problem child or with their parents concerning the problem child may be a significant ongoing emotional issue for the siblings. Family members may be emotionally isolated from each other and unsupportive of one another's attempts to deal with the problem child.

4. Restriction of Social Involvement - This refers to the extent to which the family, or some part of the family, is restricted in their social activity because of the problem child. Parents may not go out in public (e.g., to church, store) with the child because they are embarrassed about his behavior. They may be unable to go out alone because they are unable to find a babysitter due to the child's special problems. Family members may avoid bringing friends home because they are embarrassed about the problem child. Caring for the problem child may restrict work or social activities of one or both parents. The social activities mentioned above may not be impossible, but simply difficult because of the child's problems.

0 - No problem - The child's problem has no effect upon the family's social life.

1 - Doubtful or trivial - The child's problem behavior may occasionally be an issue in the family's interaction with people outside of the family but this is rare and is not a factor in the family's planning for activities.

2 - Mild - The family occasionally finds the child's behavior difficult in social situations. They are restricted in their planning of social activities significantly more than are families of normal children. They may be able to get babysitters occasionally but not regularly. Siblings may occasionally be embarrassed by the problem child's behavior.

3 - Moderate - The family often finds the child's behavior difficult in social situations. Certain activities which the family might like to engage in are impossible because of the child's behavior. They may almost never be able to get a babysitter. People may occasionally act as if there is something wrong with the family since they have a child who seems strange.

4 - Severe - The family may rarely go out together as a result of problems with the child. Family members may feel that they are the object of scorn or ridicule. One or both parents may be restricted in the type of work they can do because of the special problems of the child (as opposed to the normal burdens of raising children). The problem child may be an ongoing source of strain between siblings and their friends.

5. Mother's Understanding of Child - This is a rating of the accuracy of maternal perceptions concerning the nature of their child's disabilities and behavior problems, as discussed in the interview. Use the discussion of the specific problem(s) in conjunction with the information you are given on the child to make this rating. You should consider any of the mother's views concerning the causes of her child's behavior, the nature of his disabilities and problems, and the future of her child. Because of the nature of the interview, you will usually have to make your judgment primarily on the basis of her understanding of the nature of present problems.

0 - No problem - The mother appears to have a good understanding of almost all aspects of her child's problems.

1 - Doubtful or trivial - The mother appears to have a fairly good understanding of her child's problems. She may have some minor misconceptions about his abilities or selected skill areas. She may be confused about a particular diagnostic label, but her practical understanding of the child is good.

2 - Mild - The mother knows that the child is functioning poorly in some area (e.g., intellectual, behavioral) but does not understand the significance of this fact. She may expect the problems to clear up more easily than is likely. Her expectations of the child are sometimes unreasonable. On the other hand, she may underestimate to some extent what her child is capable of in her discipline and expectations for the future.

3 - Moderate - The mother knows that her child's behavior is unusual but credits him with skills and knowledge clearly beyond his level of functioning. She may express a good deal of uncertainty about what is wrong with the child and what he can or cannnot do. Her expectations of the child may often be unreasonable, or she may grossly underestimate his abilities.

4 - Severe - The mother views a child with clearly problematic development or behavior as normal. Alternatively, she may report complete confusion over the child's condition and diagnosis. Finally, she may expect nothing of a child for whom progress is possible.

6. Parents' Management Skills - This refers to the extent to which the parents are effectively coping with the problem. In making this rating, you should consider the optimal solutions for a given problem, taking into account the severity of the problem and the likelihood of its being fully eliminated in the short run. If this is likely, do the parents seem to be pursuing a course which will accomplish this? If not, are they engaging in a strategy which will best minimize the problem. Is their solution to the problem one that disrupts the family's functioning as little as possible? Is their solution likely to be long-lasting?

0 - No problem - The parents are making appropriate attempts to deal with the problem which are likely to be maximally successful, given the nature of the problem.

1 - Doubtful or trivial - The parents are making good attempts to handle the problem, but may be allowing the problem to have a slightly more disruptive effect on the family than is necessary.

2 - Mild - The parents are making some attempts to deal with the problem but do not have sufficient management skills to deal with it with consistent effectiveness.

3 - Moderate - The parents have tried to handle the problem but their attempts are either ineffective or else require a significant disruption of family functioning to be carried out. Their efforts are likely to produce short-term gains only, where long-term gains seem to be possible instead.

4 - Severe - The parents may be resigned to the problem. Their solutions may be as disruptive to the family as the problem itself.

7. Current Situation - This is a rating of your overall impression concerning the adjustment of the family to the problems present by the psychotic child. It should represent a synthesis of the information produced in the interview and should not be tied to any specific area of family functioning.

0 - No problem

1 - Doubtful or trivial

2 - Mild

3 - Moderate

4 - Severe

INFORMATION FOR RATERS OF FAMILY FUNCTIONING

(To be given to raters prior to their listening to the interview)

Interview number:

Age of Child:

IQ Info: Psychotic Rating:

Expressive Language Level:

Receptive Language Level:

Fine Motor Skills:

Gross Motor Skills:

Cognitive Non-Verbal Skills:

Vineland Social Age:

SCORE SHEET FOR RATINGS OF PROBLEM IMPACT

Interview number:

Rater:

Date of rating:

Circle the number which is most applicable for each area:

1. Severity of Child's Problem Behavior

0	1	2	3	4
No problem	Doubtful or Trivial	Mild	Moderate	Severe

Notes:

2. Mother's Emotional Upset

0	1	2	3	4
No problem	Doubtful or Trivial	Mild	Moderate	Severe

Notes:

3. Discord in Family System

0	1	2	3	4
No problem	Doubtful or Trivial	Mild	Moderate	Severe

Notes:

4. Restriction of Social Involvement

0	1	2	3	4
No problem	Doubtful or Trivial	Mild	Moderate	Severe

Notes:

5. Mother's Understanding of Child

0	1	2	3	4
No problem	Doubtful or Trivial	Mild	Moderate	Severe

Notes:

6. Parents' Management Skills

0	1	2	3	4
No problem	Doubtful or Trivial	Mild	Moderate	Severe

Notes:

7. Current Situation

0	1	2	3	4
No problem	Doubtful or Trivial	Mild	Moderate	Severe

Amount of Probing for Problems by Interviewer

-	0	+
Less than usual	Same as usual	More than usual

APPENDIX D

QUESTIONNAIRE ON THE EFFECTS OF TREATMENT (MOTHER) (adapted from Patterson and Reid, 1973)

(To be completed by mothers during final home visit)

For each item, circle the alternative which is closest to the truth:

1. As a result of my involvement with the TEACCH Program, my child has

   1 Become much worse
   2 Become slightly worse
   3 Not changed
   4 Improved slightly
   5 Improved markedly

2. As a result of my involvement with the TEACCH Program, I have:

   1 Much less of an understanding of my child
   2 Slightly less of an understanding of my child
   3 About the same understanding of my child
   4 A slightly better understanding of my child
   5 A much better understanding of my child

3. As a result of my involvement with the TEACCH Program, my family has, on the whole, begun to function:

   1 Much worse
   2 Slightly worse
   3 About the same
   4 Slightly better
   5 Much better

4. As a result of my involvement with the TEACCH Program, my child seems:

   1 Much less happy at home
   2 Slightly less happy at home
   3 About the same
   4 Slightly more happy at home
   5 Much happier at home

5. As a result of my involvement with the TEACCH Program, I feel:

   1 Much less comfortable with my child
   2 Slightly less comfortable with my child
   3 About the same with my child
   4 Slightly more comfortable with my child
   5 Much more comfortable with my child

6. As a result of my involvement with the TEACCH Program, my child communicates:

   1 Much less than before
   2 Slightly less than before
   3 About the same amount as before
   4 Slightly more than before
   5 Much more than before

7. As a result of my involvement with the TEACCH Program, my child is:

   1 Much less responsive to me
   2 Slightly less responsive to me
   3 About as responsive as before
   4 Slightly more responsive to me
   5 Much more responsive to me

8. As a result of my involvement with the TEACCH Program, my child plays like a normal child:

   1 Much less
   2 Slightly less
   3 About the same
   4 Slightly more
   5 Much more

9. As a result of my involvement with the TEACCH Program, my child does unusual things:

   1 Much less
   2 Slightly less
   3 About the same
   4 Slightly more
   5 Much more

10. As a result of my involvement with the TEACCH Program, I am:

   1 A much worse teacher of my child
   2 A slightly worse teacher of my child
   3 About the same as a teacher of my child
   4 A slightly better teacher of my child
   5 A much better teacher of my child

QUESTIONNAIRE ON THE EFFECTS OF TREATMENT (FATHER) (adapted from Patterson and Reid, 1973)

(To be completed by fathers during the final home visit)

For each item, circle the alternative which is closest to the truth:

1. As a result of involvement with the TEACCH Program, my child has

   1 Become much worse
   2 Become slightly worse
   3 Not changed
   4 Improved slightly
   5 Improved markedly

2. As a result of involvement with the TEACCH Program, I have:

   1 Much less of an understanding of my child
   2 Slightly less of an understanding of my child
   3 About the same understanding of my child
   4 A slightly better understanding of my child
   5 A much better understanding of my child

3. As a result of involvement with the TEACCH Program, my family has, on the whole, begun to function:

   1 Much worse
   2 Slightly worse
   3 About the same
   4 Slightly better
   5 Much better

4. As a result of involvement with the TEACCH Program, my child seems:

   1 Much less happy at home
   2 Slightly less happy at home
   3 About the same
   4 Slightly more happy at home
   5 Much happier at home

5. As a result of involvement with the TEACCH Program, I feel:

   1 Much less comfortable with my child
   2 Slightly less comfortable with my child
   3 About the same with my child
   4 Slightly more comfortable with my child
   5 Much more comfortable with my child

6. As a result of involvement with the TEACCH Program, my child communicates:

   1 Much less than before
   2 Slightly less than before
   3 About the same amount as before
   4 Slightly more than before
   5 Much more than before

7. As a result of involvement with the TEACCH Program, my child is:

   1 Much less responsive to me
   2 Slightly less responsive to me
   3 About as responsive as before
   4 Slightly more responsive to me
   5 Much more responsive to me

8. As a result of involvement with the TEACCH Program, my child plays like a normal child:

   1 Much less
   2 Slightly less
   3 About the same
   4 Slightly more
   5 Much more

9. As a result of involvement with the TEACCH Program, my child does unusual things:

   1 Much less
   2 Slightly less
   3 About the same
   4 Slightly more
   5 Much more

10. As a result of involvement with the TEACCH Program, I am:

   1 A much worse teacher of my child
   2 A slightly worse teacher of my child
   3 About the same as a teacher of my child
   4 A slightly better teacher of my child
   5 A much better teacher of my child

APPENDIX E

APPARATUS CHECKLIST FOR HOME VISITS

Two tape recorders	☐	☐
both charged or with plug	☐	☐
Rating tape	☐	
60 min. tape (for interview and language sample)	☐	
Ear plug set	☐	
Microphone	☐	
Coding sheets (8 sets)	☐	
Two clipboards	☐	☐
4 pencils (sharpened)	☐	
Interview schedule	☐	
Parent questionnaire D (if final visit)	☐	
Research permission form (2)	☐	
Child effects questionnaire G	☐	
Directions to home	☐	
Family's phone number	☐	
Problem areas for interview	☐	

APPENDIX F

QUESTIONNAIRE ON EFFECTS OF CHILD PROBLEMS ON FAMILY

Child's Name:_____ Session #_____

We would like to have you make some ratings of the effect of your child's problems on your family. For each question below circle the number of the rating which best fits your answer to each question.

For example, look at the first question. If your child's problem behavior is extremely severe, you would circle 7. If it is only slightly severe, you would circle 2 since 2 is between "not severe" and somewhat severe". Do the other questions in the same way. Feel free to circle any of the seven choices that you think is appropriate.

1. How severe is your child's problem behavior?

1	2	3	4	5	6	7
not severe		somewhat severe		very severe		extremely severe

2. How emotionally upset do you feel about your child's behavior?

1	2	3	4	5	6	7
not upset		somewhat upset		very upset		extremely upset

3. What is the effect of your child's behavior on how the other members of your household (including yourself get along with each other?

1	2	3	4	5	6	7
very positive		somewhat positive		somewhat negative		very negative

4. What is the effect of your child's behavior on your family's relations with people outside of the family?

1	2	3	4	5	6	7
very positive		somewhat positive		somewhat negative		very negative

5. How well do you think you understand your child?

1	2	3	4	5	6	7
very well		somewhat well		not well		poorly

6. How well do you think you manage your child's behavior?

1	2	3	4	5	6	7
very well		somewhat well		not well		poorly

7. Overall, what sort of effect do you feel your child's problems have on your family?

1	2	3	4	5	6	7
very positive		somewhat positive		somewhat negative		very negative

APPENDIX G

INITIAL RESEARCH PHONE CONTACT WITH PARENTS

1. Introduce self
2. Indicate awareness of appointment for diagnostic evaluation with TEACCH
3. Express desire to talk about research project which is designed to help TEACCH improve services to families like theirs
4. Ask if family will come for extended diagnostic
5. Describe purpose of study: To look at child's behavior in home environment and examine changes over time in this behavior
6. What it involves:
   a) Myself and research assistant visiting home
   b) I will talk to mother for 45 minutes-1 hour about child's problems
   c) Then we will observe child's behavior in three different 1/2 hour segments
   d) We will make 3 different visits
7. Indicate that family need not participate to get help from TEACCH
8. Note that the research procedures are likely to be helpful in the treatment of the child because of additional information gained
9. Ask if family wants to participate (or wants to think it over)
10. If yes: Set up appointment for home visit. Get directions to family home.

APPENDIX H

OUTLINE OF INTRODUCTION OF RESEARCH PROJECT TO FAMILIES ON HOME VISITS

I. Greetings and Introductions

   A. Be informal, friendly, interested
   B. Sit down to describe study and procedures

II. Purpose of Study

   A. To get an idea of what it is really like for families
   B. Also to see how things change over time

III. Researcher's Role

   A. To collect information before treatment begins
   B. Researchers to make two visits for information gathering before treatment starts
   C. Researcher will not be the family's therapist and cannot give family advice on how to deal with child for two reasons
      1. Does not have adequate therapeutic contact
      2. Must preserve objectivity as a researcher

IV. Dissemination of Information (gained on home visits)

   A. There will be a third visit to the family after treatment has begun
   B. After this visit, important information gained on home visits will be discussed with the therapist and family (unless family opposes this for some or all of the information)
   C. This information will be unusually detailed information which should help plan treatment for the child
   D. As noted above, families will get this information only after the third visit in all cases

V. Signing of Consent Forms

   A. Explain that information from the study will be accessible only to me and my research assistants and the family's therapists according to the family's desires
   B. Stringent procedures are used to preserve the confidentiality of the data
   C. Ask them to sign forms

VI. Describe Schedule of Visit

   A. Interview mother alone (research assistant may look after child if needed)
   B. My assistant and myself will observe parents and child together
   C. Observations call for family to be in sight of observers and together for 1/2 hour at a time

VI. D. Same people should be present each visit
E. We want family to act as naturally as possible at these times

VII. Ask if Parents Have Any Questions

APPENDIX I

RESEARCH CONSENT FORM FOR HOME OBSERVATION STUDY

Division TEACCH

Child's Name_____

Parent or Legal Guardian's Name_____

Date_____

In the interest of improving our understanding and treatment of difficult children, I agree to participate in a research project involving home observation. I understand that Mr. Short and his assistant will make three visits to my home to make some observations and ask questions about how our child affects the family. This interview and some of the observations will be audiotaped.

I understand that I do not have to participate in this study and may withdraw my consent at any time. Refusing to participate will not change my child's treatment in any way. I may contact Dr. Lee Marcus, Director of Piedmont TEACCH Center (919-966-5156), if I have concerns about the study. I may also contact the Director of TEACCH, Dr. Eric Schopler (919-966-2174), if there are any problems.

This research data may be used for publication or training; however, it is specifically understood that in any such use, my name or that of my child will not be identified. However, the information will be shared with the clinical staff if it will help in planning my child's program.

I am legally responsible for this child.

_____
Signature

_____
Witness

TABLE 11

PARENT INVOLVEMENT SCORES (PAR) BY FAMILY

Case Number	1st Visit	2nd Visit	3rd Visit
1	.47	.63	1.01
2	.42	.08	.61
3	.47	.70	.86
4	.82	.87	.96
5	.58	.63	.71
6	.71	1.19	1.26
7	.41	.65	1.02
8	.45	.83	1.36
9	.51	.26	.63
10	.88	.72	.90
11	1.13	.94	1.04
12	1.48	1.01	1.15
13	.70	.96	1.16
14	.66	.69	.79
15	.73	.94	1.19

TABLE 12

APPROPRIATE CHILD BEHAVIOR (APP) BY FAMILY

Case Number	1st Visit	2nd Visit	3rd Visit
1	1.34	1.50	1.86
2	.38	.05	.43
3	.39	.60	.98
4	.99	.81	1.14
5	.90	.87	1.36
6	.71	.97	1.53
7	.32	.43	.88
8	.77	1.50	2.42
9	.39	.18	.64
10	1.02	.67	1.16
11	2.29	2.05	2.20
12	1.23	1.05	1.53
13	.46	.82	1.17
14	1.33	1.19	1.54
15	.32	.70	.93

APPENDIX J

TABLE 13

INAPPROPRIATE CHILD BEHAVIOR (INA) BY FAMILY

Case Number	1st Visit	2nd Visit	3rd Visit
1	.17	.12	.05
2	1.33	1.78	.84
3	.63	.42	.15
4	.31	.43	.32
5	.37	.36	.15
6	.46	.36	.19
7	.82	.70	.52
8	.40	.12	.01
9	.98	1.29	.93
10	.08	.38	.11
11	.02	.05	.07
12	.09	.20	.07
13	.58	.22	.11
14	.25	.31	.22
15	.71	.34	.30

APPENDIX J

TABLE 14

STRESS SCORES BY FAMILY

Case Number	1st Visit	2nd Visit	3rd Visit
1	5.0	9.5	6.0
2	22.5	18.5	17.0
3	17.5	15.0	11.5
4	6.0	6.5	7.0
5	8.5	7.0	4.5
6	7.5	9.5	6.0
7	22.0	19.0	16.0
8	20.0	17.5	8.0
9	20.0	20.5	10.0
10	18.5	20.0	19.5
11	19.0	11.5	6.5
12	11.0	12.5	8.5
13	20.5	16.0	7.0
14	11.0	5.5	7.0
15	11.0	11.0	10.5

APPENDIX J

TABLE 15

MEAN SCORES ON INAPPROPRIATE CHILD BEHAVIORS[1]

		1st Visit	2nd Visit	3rd Visit
Self-stimulation(SS)	$\bar{X}$	.03	.04	.04
	SD	.09	.10	.10
Repetitive Object Play(RP)	$\bar{X}$	.06	.07	.02
	SD	.18	.21	.06
Sustained Non-interaction(NI)	$\bar{X}$	.39	.37	.21
	SD	.24	.26	.17

[1]Echolalia was excluded because of inadequate reliability.

TABLE 16

MEAN SCORES FOR INTERVIEW RATING AREAS

		1st Visit	2nd Visit	3rd Visit
Severity of Child Problem	$\bar{X}$	2.87	2.77	2.40
	SD	.83	.65	.60
Mother's Emotional Upset	$\bar{X}$	2.33	2.27	1.67
	SD	.96	.82	.92
Discord in Family System	$\bar{X}$	1.60	1.20	.97
	SD	1.15	.98	.93
Restriction of Social Involvement	$\bar{X}$	2.07	2.07	1.43
	SD	1.24	1.28	.88
Mother's Understanding of Child	$\bar{X}$	1.80	1.43	1.17
	SD	.86	.96	.82
Parent's Management Skills	$\bar{X}$	1.83	1.50	.77
	SD	1.08	1.04	1.08
Current Situation	$\bar{X}$	2.23	2.07	1.27
	SD	1.16	1.00	.84